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BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 6 1952

PROGRESS IN CONTROL OF CHOLERA IN INDIA BY INOCULATION OF PILGRIMS

BY

Sir LEONARD ROGERS, M.D., F.R.C.P., F.R.S.

Information received from a former Indian colleague regarding the increasing success of the method of controlling the spread of cholera in India led me to find confirmatory evidence in recent public health reports from that home of the disease. A very brief review of investigations of the last four decades, which resulted in the adoption of the present methods of control, may therefore be timely.

During 1908 to 1920 the system of treatment of cholera by hypertonic and alkaline salines intravenously and permanganates orally reduced the case mortality from 59% to 20.8% in 1,429 severe hospital cases treated during 1915–19 in Calcutta (Rogers, 1908, 1915, 1921).

Unfortunately, 85% of the vast population of India live in villages without protected water supplies, hospitals, or well-qualified doctors, so but little reduction in the average yearly mortality of some 300,000 from cholera has been obtained by the improved hospital treatment, except in urban populations.

During 1925–7 I made a very comprehensive study of the monthly cholera deaths in 100 divisions of India in relation to meteorological data for five decades, and worked out distribution maps for 45 years in relation to the provincial rainfalls (Rogers, 1927, 1928). It was thus established that 40 out of 41 major epidemics had ensued on deficient monsoon rains of the previous June to October in the particular areas of the outbreaks. In the one exception, in 1894, the epidemic followed the khumb fair at Allahabad with 3,000,000 pilgrims, aided by exceptionally high absolute humidity. Moreover, nearly all the major epidemics followed such fairs, which had a total attendance of some 20,000,000 pilgrims yearly who were mainly infected during journeys of up to several hundred miles through cholera-infected villages, which good sanitation at the fairs themselves could not control. It was also found that approximately correct forecasts of the incidence of cholera in any year could be worked out from the previous monsoon and winter rains, and such forecasts were published by me before the cholera season (Rogers, 1933).

A Revolutionary Proposal

These laborious inquiries led me in 1927 boldly to declare that the only method by which the high Indian cholera mortality could be reduced under present conditions was by the use of compulsory anti-cholera inoculation of all pilgrims travelling through infected insanitary villages before they reached the fairs. This was such a revolutionary proposal that it is not altogether surprising that at the 1930 annual meeting of the directors of public health it was unanimously rejected with the finding that my plan was "impracticable, inexpedient, and even dangerous." Further, very experienced governors of Indian provinces declared the measure to be impracticable under the prevailing "political" conditions.

I had therefore patiently to await events and to rely on the truth of the saying: "Cast thy bread upon the waters: for thou shalt find it after many days." In 1936 the Bombay public health authorities found themselves faced with the strong probability of a serious outbreak of cholera in the Deccan following the annual July fair at Pandarpur; a fair which had yearly been responsible for spreading cholera, except in 1910, when the public health officers were unable to account for its absence, although my map for that year showed an exceptionally low cholera incidence and no outbreaks in the areas from which the Pandarpur pilgrims came. On the other hand, 1936 was a year of high cholera prevalence due to the spread of cholera from the Allahabad and other fairs. In this serious emergency the responsible authorities had the courage to order compulsory anti-cholera inoculations of all the Pandarpur pilgrims *before* they were allowed to proceed to the fair. Very little trouble occurred in this year only, and they were able to report, for the first time on record when cholera was prevalent, that "the spread of the disease [by the Pandarpur pilgrims] was thus averted." The same measure was followed by similar success in the ensuing five years, and in 1944 I was able to demonstrate the beneficial results of the new measure by tabulating the Pandarpur cholera data of six years before and six years after the trials began (Rogers, 1944).

The Results of Inoculation

As a result the Central Board of Health (who had rejected so emphatically my proposal in 1930) now recommended trials of my plan of cholera control in every province in India, the results of which are now available in recent reports from India, which remain to be noted.

The series of some 70 years' annual sanitary reports for British-administered India came to an end with that for 1946 (Annual Report of the Public Health Commission, 1946) with the partition of India and of some of the provinces—such as Bengal and the Punjab. The following information and quotations from the report for 1946 will suffice to illustrate recent conclusions regarding the use of compulsory inoculation of pilgrims in controlling cholera outbreaks in India. Thus on page 3 of the report it is recorded that "compulsory anti-cholera inoculation is being increasingly enforced by the provinces for such gatherings [fairs and festivals], a measure which has proved highly successful in eliminating the spread of cholera during the movements of pilgrims." In dealing with cholera incidence in the provinces during 1946 it is noted that the disease was mild throughout the country. Only in Bihar and Orissa were there epidemics, and the disease was also prevalent in

the endemic areas of Bengal and Orissa; but even in these the incidence was less than in 1945. In the remaining seven provinces the incidence was very low, and in the Madras Presidency the 753 deaths were the lowest recorded for 65 years. This was no doubt due to previous good north-east monsoon rains in the last quarter of 1945; for in 1943 no fewer than 117,039 cholera deaths in this province followed "failure of the monsoon rain and consequent water scarcity, coupled with extreme inadequacy of protected water."

It is also recorded in this report that "in some provinces compulsory inoculation was enforced in gatherings in connexion with fairs and festivals, and thus the usual outbreak of the disease was avoided. . . . The practicability and advisability of enforcing inoculations in big gatherings, which are known to cause epidemics, should be the rule rather than the exception." This important finding is confirmed by very similar statements with regard to other provinces with any material prevalence of cholera.

A word of caution is, however, necessary, for in my paper of 1944 I included a table to show the average number of cholera deaths per 1,000 for all India, and for each province, for six decades from 1880 to 1939, together with the data for every year with rates, above and below the average for each decade, in relation to high or low previous monsoon rains and the incidence of the dangerous 12-yearly specially large fairs at Allahabad and Hardwar. These data so clearly illustrate the influence of deficient antecedent monsoon rains in increasing, and of good such rains in decreasing, cholera incidence, that the exceptionally low rates in nearly all the non-endemic areas of India in 1946 must have been mainly due to very favourable preceding rains having provided exceptionally good drinking-water supplies over a large proportion of India. On the other hand, it is of interest to note that in the case of the Samaria Ghat fair in Bihar (which was an unexpected one recurring at long and irregular intervals) neither the usual sanitary precautions nor anti-cholera inoculations were carried out, with the result that a smart outbreak of cholera followed this fair only.

A Sheet-anchor of Defence

A great increase in the yearly total anti-cholera inoculations in India, with the widespread adoption of compulsory inoculation of pilgrims, may be illustrated by the following data. In 1928–33 the average total anti-cholera inoculations in India numbered 2,700,000, and in 1934 they averaged 6,649,000 (Rogers, 1944). On the other hand, in 1946, when the inoculation of pilgrims was in general use, the total figure for eight provinces for which they were recorded (some new provinces having in the meantime been organized) was 19,85?,000. But the data of three provinces, containing over one-sixth of the total population, are not given in the report, and if they had a similar proportion (in two of them either "extensive" or "mass inoculations" are mentioned) the yearly total must have amounted to 24,000,000.

Further, on the efficacy of the vaccines used the 1946 report recorded that an evaluation of anti-cholera inoculation by a director of public health, Madras, and a supplementary statistical analysis by the professor of statistics at the All-India Institute of Hygiene and Public Health, Calcutta, concluded that "anti-cholera inoculation affords a significant degree of protection against cholera."

Once more, the 1949 Madras State Health Report states that "anti-cholera inoculations had to be resorted to as *the sheet-anchor* in the defence against cholera, as the environmental hygiene conditions of the villages were far from satisfactory. About 4,600,000 anti-cholera inoculations were performed during the year." It is satisfactory to note that the Cauvery delta main endemic area of Southern Madras has been chosen by the World Health Organization for the implementation of a cholera eradication demonstration, so a well-controlled trial of anti-cholera inoculations should soon be forthcoming (Report on Health Conditions in Madras, 1949).

Conclusion

The ultimate control of outbreaks of cholera in rural India is likely to be obtained only by the gradual extension throughout the million or so of unhygienic villages of India, inhabited by 85% of the total population, of the provision of adequate supplies of safe drinking-water—such as have in the last two or three decades materially reduced the incidence of cholera in the much smaller urban population. As this will require several decades at least, in the meantime the increasingly successful adoption of inoculation of pilgrims all over India appears to be the most effective method of controlling cholera outbreaks under present conditions in India, and, if political conditions allow, also in the other great endemic cholera centre, China.

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THE CHEMOTHERAPY OF LEPROSY*

BY

R. G. COCHRANE, M.D., F.R.C.P., D.T.M.&H.

Medical Secretary, British Empire Leprosy Relief Association

As leprosy is one of the oldest diseases known to mankind, and because in its more advanced stages it causes mutilations and deformities, it has had a special place in history. The person suffering from leprosy has all too often been under a stigma, and been ostracized from the community. It is hoped, however, that, as a result of a more enlightened attitude, sufferers will no longer be branded as "lepers"—the word "leper" has by international consent been banned from scientific usage—but be accepted in society as victims of disease in the same way as sufferers from tuberculosis are to-day.

Historical

The story of the treatment of leprosy is one of absorbing interest, but in view of the modern advances in the chemotherapy only passing mention can be made to previous history.

Up to the time of the discovery of the more active therapeutic remedies the sheet anchor of treatment was hydnocarpus (chaulmoogra) oil. This traditional Indian remedy—known to indigenous physicians for many centuries—has had a chequered career. Because of the difficulty of giving the oil by mouth it became largely discarded until the pioneer work of Mercado (1914) and of Heiser (1914) in the Philippine Islands, and of Rogers (1921) and Muir (1922) in India, re-established its claim as an effective remedy for leprosy. For the sake of historical accuracy Dr. Mercado must be given due credit, for his work is apt to be forgotten. While many authorities were sceptical whether hydnocarpus (chaulmoogra) oil had any specific effect, it is of significance to note that in the long history of leprosy therapy, until the discovery of the sulphones, this ancient Eastern remedy retained its place as the most reliable treatment for that disease.

*Read in the Section of Tropical Medicine at the Joint Annual Meeting of the British Medical Association and Irish Medical Association, Dublin, 1952.

There is little point in discussing the mode of action of chaulmoogra oil. Rogers believed that the active principle was contained in the higher-melting-point fatty acids. Be that as it may, in the hands of those who were prepared to give massive doses (15–20 ml. a week) by the subcutaneous and intradermal route, the results in the early lepromatous cases, particularly in those races which responded better to treatment (Indians and Africans), were not unsatisfactory. Unfortunately, however, the relapse rate was high, and it had to be admitted that over a 6- to 12-year period most lepromatous patients relapsed and died or the disease became arrested, with severe and crippling deformity

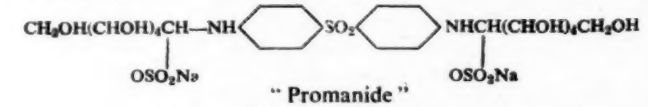
In 1935 Domagk demonstrated that sulphonamides had a chemotherapeutic activity against pathogenic cocci. These drugs were given extensive trials in diseases other than the acute "coccal" infections, and so far as tuberculosis was concerned were found to be inactive, and therefore were not seriously considered in the treatment of leprosy. It is interesting to note that in 1936 a trial of sulphapyridine was undertaken in South India (Cochrane, 1947). The general conclusions of this trial may be of interest. They were as follows: (*a*) The remedy is apt to produce acute lepra reaction, and in some cases this is exceptionally severe. (*b*) There is no evidence that the patient's leprosy condition is benefited by sulphapyridine. (*c*) There seems to be a greater tendency for nausea, alterations in pulse rate, and drug dermatitis to occur in leprosy patients than in persons suffering from other diseases. (*d*) The sulphonamide preparations in the form of pastes have a decided place in the treatment of certain types of trophic ulcers. (*e*) The sulphonamides seem to have no influence on leprosy and should not be used unless there are specific indications for their use.

As the original trial was undertaken with sulphapyridine, it cannot be said that the less toxic sulphonamides may not be more effective, but because of the development of the sulphone group of drugs it would probably be uneconomical to reinvestigate the activity of the more complex sulphonamides.

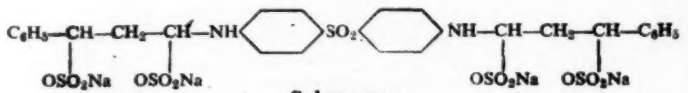
The Sulphones

When the sulphonamides were rejected in the therapy of leprosy, workers turned their attention to a substance which was synthesized by Fromm and Wittmann (1908)—namely, diaminodiphenyl sulphone (D.D.S.). While D.D.S. was found effective against *Mycobacterium tuberculosis*, experimentally it was discarded because of its relatively high toxicity, and, further, the advent of more powerful antituberculosis drugs—for example, streptomycin and *para*-aminosalicylic acid (P.A.S.)—rendered D.D.S. of little value in the treatment of this disease.

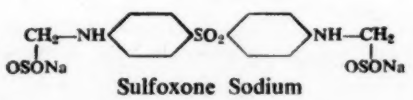
The next step in the chemotherapy of leprosy was the synthesis of three derivatives of the parent substance—namely, "promanide" (1935; "promin" in U.S.A.), solapsone ("sulphetrone") (1936), and sulfoxone sodium ("diasone") (1938). The structural formulae of these compounds are as follows:



"Promanide"

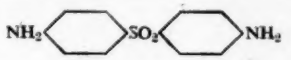


Solapsone



Sulfoxone Sodium

It will be seen that all these substances are disubstituted derivatives of the parent substance, diaminodiphenyl sulphone, the formula of which is



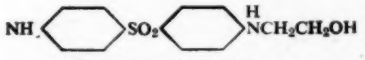
In other words, in the disubstituted sulphones both the amino groups have been blocked. As a result of further work, particularly by Francis and Spinks (1950), Lowe and Smith (1949), Floch and Destombes (1949), and Lowe (1952), evidence was brought forward to show that, orally, these disubstituted sulphones were hydrolysed by the acids in the stomach to the parent sulphone, and therefore it was argued that it was illogical to give disubstituted sulphones when they merely acted as D.D.S. by breakdown in the gut to the parent substance. It was contended that the toxicity of the parent substance could be overcome by giving it in much smaller dosages.

Monosubstituted Sulphones

It has, however, been suggested by Payne (1951, personal communication) that the monosubstituted sulphones are active. If this conclusion is correct we have now to discuss three other points: (1) the evidence that monosubstituted sulphones are active in themselves; (2) the evidence that certain disubstituted sulphones—for example, solapsone—when given parenterally, are broken down to the monosubstituted form; and (3) the chemical changes which the parent sulphone undergoes when it is given orally or parenterally.

With regard to the first point, very limited work has been done on the monosubstituted sulphones. These are difficult to make and tend to be unstable. In our trial of fairly numerous derivatives of D.D.S. we have undertaken limited experiments with two substances which, according to their chemical structure, appear to be monosubstituted derivatives of D.D.S. These are as follows:

Sulphone cilag



Hydroxyethylsulphone

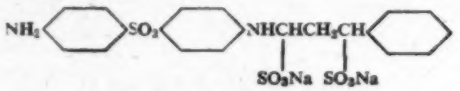
Because the quantities of these drugs which we received were limited, and because of the closure of the Research Unit in South India, our general conclusions have to be tentative. Both these monosubstituted compounds were found to have some activity in leprosy. The activity of hydroxyethylsulphone appeared to be less than that of sulphone cilag, but the latter had an activity apparently as effective as the parent sulphone.

With regard to side-reactions, sulphone cilag produced lepra reaction (erythema nodosum phenomena) in a significant number of patients (38%), and in 38% of cases there was some depression of the haemoglobin value. Apart from one case of mild jaundice, there was no evidence that sulphone cilag showed other signs of toxicity—for example, hepatic damage, dermatitis, or effects on the central nervous system (psychosis). With regard to hydroxyethylsulphone, there was a higher percentage of cases showing signs of hepatic damage (two with enlarged liver—one accompanied by jaundice—and two with urobilin in the urine). In three cases the haemoglobin level was slightly depressed. The total number of cases, however, was only seven.

Biochemistry of Solapsone

Secondly, much work has recently been done on the biochemistry of solapsone, and it is generally admitted that solapsone parenterally is not significantly broken down to the parent sulphone. Lowe contends that as disubstituted sulphones are inactive,

the action of solapsone is due to the D.D.S. being present as an impurity in sufficient quantities to act in a therapeutic dose. We have recently had several samples of a 50% aqueous solution of solapsone analysed, and have found less than 12 mg. of the parent sulphone per gramme of the solution. The parent sulphone, therefore, either as a breakdown product through autoclaving or as an impurity, is present in such small quantities that it cannot be therapeutically active, for it is hardly likely that as small a dose as 24–36 mg. a week is clinically effective. Recent work shows that not only does solapsone contain a monosubstituted derivative of D.D.S., but it dissociates to form this monosubstituted compound. It apparently does not, in fact, break down in any appreciable quantity to D.D.S. when given parenterally. The probable formula of this substance is as follows:



It is therefore seen that this substance is a monosubstituted derivative, and this may explain the effectiveness and lack of toxicity of solapsone when administered parenterally. It must therefore be concluded that there is, up to now, no valid evidence to assume that solapsone in a 50% solution—the more diluted solutions are unstable—contains enough of D.D.S. to explain its activity in terms of the parent sulphone.

Chemical Changes

We now turn to our third point—How is the parent sulphone disposed of in the body? Several workers have shown that D.D.S. is excreted partly as a water-soluble derivative, and a recent interesting and informative article by Lowe indicates that when given parenterally as much as 80% is excreted in this form in the urine. According to Bushby and Woiwod (unpublished) it is a monosubstituted derivative. Thus D.D.S. in the body is converted into one of the monosubstituted derivatives, but where this conversion takes place is surmise, though it is suggested that D.D.S. may be detoxicated in the liver.

If one examines the urine of patients on D.D.S. in a proportion of cases urobilin can be demonstrated in the urine; the percentage of persons showing this depends partly on the dosage and partly on the individual. For instance, in areas where there is a relatively high lepromatous rate (30–50% of the total cases of leprosy) there seem to be a number of cases showing urobilin in the urine (3–5% on the bi-weekly dosage of 300–400 mg.). This means constant but mild hepatic damage. One has to admit that in order to treat effectively a disease of such chronicity as leprosy there will always be cases which will show signs of toxicity to so powerful a drug as D.D.S. Those who advocate the use of the parent sulphone state that this is a price worth paying. Nevertheless, if it is confirmed that the monosubstituted compounds are active in leprosy, and that the body detoxicates the relatively poisonous parent substance by conversion to a monosubstituted derivative, then the argument that it is more logical to give the parent substance cannot be maintained.

Other Chemotherapeutic Agents Used in Leprosy

Of these substances the thiosemicarbazones have had the widest trial. Unfortunately the original claims of Ryrie (1950) that they are as effective as the sulphones have not been substantiated. It, however, has been shown that thiosemicarbazone has some activity in leprosy, and where there is intolerance to the sulphones thiosemicarbazone can be substituted. In other words, this group of drugs should be looked upon as a second line of attack. So far as is known, the thiosemicarbazones have two drawbacks: (1) the drug has to be given by the oral route daily; and (2) it is not free from toxic signs. Lowe (1952) recently has had three cases of agranulocytosis.

Both P.A.S. and streptomycin have been used in leprosy. These drugs show some activity against the *Mycobacterium leprae*, but it is much less than that of the sulphones, and the long duration of treatment (two to five years) would preclude their use, both on the score that such prolonged treatment would not be practicable, and because streptomycin could not be continued for so long a period without toxic signs.

The discovery of the anti-tuberculosis action of *iso*nicotinic acid hydrazide has raised hopes that this may be effective in leprosy. While it is reasonable to assume that if a drug is effective either *in vitro* or *in vivo* against *M. tuberculosis* it may also be an effective therapeutic agent in leprosy, this assumption may not be correct. Streptomycin and P.A.S. are excellent drugs for the treatment of tuberculosis, but of much less value in leprosy. The sulphones are the most potent anti-leprosy drugs we have at present, but they have a very limited place in the treatment of tuberculosis.

Criteria of Cure

The question now arises regarding the criteria of an effective therapeutic remedy in leprosy. Recent histopathological investigation in the follow-up of lepromatous cases of leprosy under sulphone treatment indicates that there are four stages in the progress of the disease towards "clinical cure." (1) A change in the morphology of the *M. leprae*; (2) a phase in which the *M. leprae* appears to be stimulated into activity; (3) a phase when the bacilli begin to diminish and presumably reproductive capacity is affected, and (4) when *M. leprae* cease to multiply the process of disintegration continues until the bacilli are reduced to acid-fast dust, and the macrophages ultimately dispose—in a large number of cases—of these degenerate forms, thus curing the disease.

If the tissues of the body are able to destroy the bacilli completely, then a relapse is unlikely. It is known, however, that bacilli in the granular form, in a large proportion of cases, are often found in the small nerves of the skin when they are no longer detectable in the tissues by standard methods of examination. I am of the opinion that so long as there is detectable acid-fast material one has to conclude that this constitutes a potential source from which a relapse can take place, and treatment should therefore be continued. It may be that these granular forms are the resistant phase of the *M. leprae*, but it appears that while sulphones are being given the bacillus is unable to multiply. It evidently takes at least two years, and in many cases probably much longer, for these acid-fast granules to revert back to active acid-fast rods after sulphones have been stopped. In other words, the leprosy process reverts back to the pre-lepromatous stage, and I believe it is logical to conclude that, because a pre-leproma may take anything from a few months to ten years or more to develop into a full-blown leproma, we may have to wait ten or fifteen years before we can come to any conclusion on the permanency of sulphone "cures" in leprosy.

Discussion

Let us review the chemotherapeutic remedies in the light of the above remarks and endeavour to suggest on what criteria we should base our conclusion on the likelihood of a drug being effective in the treatment of leprosy. It is an expensive matter to make enough of a drug to undertake a large-scale clinical trial in leprosy. Therefore is it not possible to come to some tentative conclusion on a small-scale experiment before embarking on large-scale ones, which may take years to complete and be very time-consuming? I believe it is, and would suggest that a drug can be considered active against *M. leprae* if the following observations are noted: (1) marked change of morphology of the *M. leprae*; (2) precipitation of the erythema nodosum syndrome—this is an indication of activity of the *M. leprae*; (3) marked clinical improvement, with early relief of nasal obstruction; and (4) characteristic changes in the histopathological picture.

Some workers believe that the most rapid method by which to test the bacteriostatic or bactericidal properties of a drug is to select the tuberculoid cases. I am of the opinion that this may lead to erroneous conclusions, because, as I have stated, I believe that if a drug is effective then a phase is experienced in which there is evidence that the *M. leprae* is stimulated into activity. In tuberculoid leprosy such a process, because the tissues are sensitized, would be manifested in an acute tissue response; the more marked this tissue response the quicker the subsidence of the disease. Hence a trial in tuberculoid leprosy will only indicate whether a drug has the property of stimulating the bacillus. I believe a very good example of this is a drug which was first prepared by Barry in Dublin, which has been reported on by Barnes (1951), and which has been given the code number of B.283. I recently had the privilege of examining patients taking this drug in Ogoja, Western Region of Nigeria. The majority of tuberculoid cases showed much improvement, whereas the results in the lepromatous cases were disappointing. In other words, this drug has some activity, but is not powerful enough to interfere with the multiplication of the bacilli and produce any great clinical improvement in lepromatous leprosy within a reasonable time. There are many drugs of this nature.

Conclusion

I trust I have given enough evidence to indicate that the therapy of leprosy is at present at a most interesting phase. If we have not reached the stage when we can claim to have achieved complete chemotherapeutic victory, we at least can look forward to the day, perhaps not too distant, when as a result of the combined efforts of the chemists, the pathologists, and the clinicians it can confidently be asserted that leprosy as an active process can be stopped and the long-awaited cure of this disease be realized.

Even though this satisfactory result be achieved, let us ever bear in mind that our conquest is not complete so long as stigmata and sequelae of leprosy, resulting in gross deformities, remain. The time has now come for the plastic and orthopaedic surgeon to step in and complete the cure, by repairing the ravages and damage which the disease has produced and our chemotherapeutic agents have stopped.

Summary

Evidence is given that before the discovery of the sulphone preparations hydnocarpus (chaulmoogra) oil was used effectively in the early lepromatous case, but the more advanced lepromatous cases showed little response.

A review is given of the sulphone drugs most commonly used, and the drawbacks of the parent sulphone are mentioned. The reasons why aqueous solapsone is not broken down to diaminodiphenyl sulphone are discussed, and there is evidence to show that D.D.S. may be detoxicated in the body to a substituted form.

The opinion of Payne is cited that the monosubstituted sulphones may be active *per se*, and that there are sound reasons for advocating the parenteral use of solapsone ("sulphetrone") in a 50% aqueous solution as an alternative treatment.

The possible mode of action of the sulphone drugs is outlined. In cases of toxicity or intolerance to sulphone therapy, thiosemicarbazone is held to be a good substitute, although not so active as the sulphones.

While streptomycin and P.A.S. are active in leprosy, these drugs are not effective enough to warrant their use. The hope is expressed that *iso*nicotinic acid hydrazide may be found effective.

The criteria of activity of a given drug in leprosy are mentioned, and tests for a critical assessment of any drug likely to be effective in leprosy are detailed.

Finally, orthopaedic and plastic surgeons are reminded of the opportunities opened up to them in this field.

I should like to express my gratitude to Dr. S. R. M. Bushby, of the Wellcome Research Laboratories, Beckenham, for kindly reading this paper, and for his valuable help and advice in its preparation.

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AETIOLOGY AND INVESTIGATION OF VAGINAL DISCHARGE*

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Vaginal discharge is a common symptom and is often accompanied by fears that may be more distressing than the complaint itself, and thoughts of venereal disease or of cancer, for example, loom large, while feelings of guilt or uncleanness are reinforced by the patient's own repeated observations. The information is not, as a rule, volunteered, and to prescribe treatment, however impressive, without a convincing examination is to ignore a large part of the patient's real need. If a discharge is bad enough to treat it is bad enough to investigate; furthermore, empirical treatment prejudices accurate diagnosis later.

The Leucorrhoea Clinic

The busy gynaecological out-patient session is not suitable for properly assessing vaginal discharge, and there is a strong case, in any large unit, for segregating these cases, after preliminary examination, into a special clinic for the following reasons. (1) Investigation and treatment can be more deliberately carried out. All the necessary equipment is readily to hand and efficient organization becomes possible. (2) Most of the treatment involves repeated out-patient attendances only, and the other diagnostic clinics are relieved of a considerable load. (3) Better facilities are afforded for clinical research.

Such a clinic, known as the "D" clinic, has been in operation at the Chelsea Hospital for Women during the past five years, and the cases investigated to date number approximately 600. It is from these that the following figures are collected.

The patients are first seen in the out-patient department before being referred, and those in whom the discharge is found to be due to surgically amenable causes, such as gross degrees of chronic cervicitis, sloughing fibroid polyp, or neoplasm, etc., are of course admitted for appropriate treatment and do not reach the "D" clinic. If diabetes

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mellitus is found to underlie a case of monilial infection the patient is referred to the consultant physician, and cases of venereal disease are sent to special departments in general hospitals outside.

It is therefore the large group of patients with neither venereal nor surgical causes of vaginal discharge which are presented; they represent the majority of cases of vaginal discharge encountered in gynaecological practice.

Exclusion of Gonorrhoea

This is of prime importance. The early acute stages are easily recognized by the profuse discharge, acute inflammation of the vulva, particularly the duct orifices of Bartholin's glands, and the presence of pus at the external urethral meatus, elicited by pressure on the urethra. The cervix is angry-looking and oedematous, and a history of recent exposure to infection can usually be obtained.

Smear preparations, simply stained with dilute carbolfuchsin, show intracellular diplococci, and Gram staining clinches the diagnosis, for no other genital disease produces Gram-negative intracellular diplococci. Very occasionally Gram-positive diplococci may appear to be Gram-negative, having lost their staining reaction as a result of death of the micro-organism within the leucocyte. This source of error is eliminated by culture, from both cervix and urethra, on McLeod's chocolate-agar medium incubated for the first 18 hours in 10% carbon dioxide and thereafter for a further 24 hours in an ordinary atmosphere.

The colonies of gonococci are small, convex, and translucent, and flooding of the culture plate with a 1% solution of tetramethylparaphenylene diamine turns the colonies rapidly bright purple. This is known as the oxidase reaction. The gonococcal complement-fixation test, more applicable to cases of systemic infection, is, in any case, unlikely to be positive in under a month.

Exclusion of Malignant Disease of the Cervix.—If speculum examination reveals the possibility of malignancy Papanicolaou smears are taken and the patient is admitted for biopsy of the suspicious areas.

Clinical Classes of Patients Comprising the "D" Clinic

These have been grouped under four main headings (Table I). The largest number of cases are due to *Trichomonas vaginalis* infection, and form the hard core

TABLE I

Infection	No. of Cases
Trichomonas vaginitis	219 (37·4%)
Monilial	95 (16·2%)
T.V. and monilial	45 (7·7%)
Miscellaneous	196 (33·5%)
Insufficient information	30 (5·1%)
Total	585

of the clinic because chronicity readily occurs, eradication is difficult, and relapses are frequent. Even severe cases, however, continue in good general health.

Age Incidence.—Table II shows that the peak incidence occurs at 20–29 years—that is, when ovarian activity is in its prime and the vagina, in respect both of *p*H and squamous health, is more resistant to infection in general than at any other time.

TABLE II.—*Age Incidence*

Age	T.V.	Monilial Infection
Under 20 years	16	2
20–29 ,,	91	48
30–39 ,,	63	31
40–49 ,,	37	11
50 and over	10	2
Unspecified	2	1
	219	95

Aetiology of Trichomonas Vaginitis

This matter is enough, in the words of Keats, to "tease us out of thought." In the 219 cases there was a history of previous attacks in 73 (33%) and 80 (36.5%) gave a definite history of acute onset, whereas only 18 (18.9%) of those with monilial infections gave such a history. Clearly, certain factors must operate to set the inflammatory process alight.

The parasite is not necessarily pyogenic in its unaided effects, for it can be found in the healthy vagina without accompanying signs of discharge. Secondary infection with a miscellany of organisms helps to establish the characteristic punctate vaginitis, and some change in the vaginal environment is probably necessary to allow it to gain a foothold—for example, an alteration in *p*H from the normal 4.5 to the less acid levels of 5.5–6 which favour the infection. The effects of local trauma, as will be shown, also play a part, and suitable nutriment is also necessary for maintaining the trichomonads, either from the recurrent provision of menstrual blood or some alteration in vaginal chemistry.

Sexual intercourse, including abortive attempts which leave the female still technically a virgin, is one of the principal precipitating causes. No fewer than 15 of the unmarried women gave a history of developing the infection a few days after intercourse or an attempt thereat, including one unfortunate post-menopausal woman whose only adventure in this respect it had been. It is probable that there were many more who declined to volunteer such a history. Seventy-nine of the patients were unmarried, though many were by no means virgins and six had had at least one pregnancy. One unmarried girl showed the presence of trichomonads and spermatozoa as well, and another developed the disease after an abortion procured at three months.

Table III shows that, contrary to widely held belief, trichomonas vaginitis is no more a disease of married women than is monilial infection, the incidence being

TABLE III.—*Marital State*

	T.V.	Monilial Infection
Nulliparous (married and unmarried; no pregnancies)	103 (47%)	44 (44%)
Unmarried	79 (36·1%)	23 (25·3%)
Unmarried but parous	6 (2·7%)	2 (2·1%)
Unquestionably virgines intactae	12 (5·4%)	6 (6·3%)

roughly the same in both. Contraction of the infection by coitus is not, however, the whole story, because at least 12 (5.4%) of the 219 patients were virgins in both the letter and the spirit, and the disease has even been recorded in babies. Intercourse may infect direct through infected semen or the outpouring of cervical mucus, or the effects of local trauma may give the latent parasite its chance. Examination of the husbands of a few of the relapsing cases did not result in finding the trichomonads, although other workers report a significant incidence of male infection. The use of a condom contraceptive should give a high degree of protection, but 16 patients regularly used this method.

Table IV enumerates the methods used: roughly, the percentage of monilial infections in patients practising contraception was twice that of the trichomonal group. One would, however, hesitate to attribute the lower incidence in the latter to contraceptive practice on the evidence of so few cases.

TABLE IV.—*Contraception*

	T.V.	Monilial Infection
Sheath	16	15
Pessaries	10	6
Dutch cap and chemicals	7	5
Dutch cap, sheath, and chemicals	—	1
Unspecified	2	1
	35 (16%)	28 (29·5%)

Many believe that infection may be autogenous from the intestinal canal, since buccal and intestinal trichomonads are common; but these organisms are nevertheless morphologically distinct from the vaginal variety, and experimental inoculation of the vagina with the intestinal species does not reproduce the disease. Exogenous infection is restricted by the inability of the trichomonads to survive drying; but damp towels, wash-rags, and baths cannot be ruled out as possible sources of infection.

Careless nursing techniques must be a serious potential danger in gynaecological departments, and the not infrequent use of the same examining glove for successive patients, punctuated by ritual immersion in bowls of antiseptic, is highly reprehensible in this and other respects; it is a dangerous and slovenly practice which no shortage of gloves or nurses can adequately excuse.

However the organism reaches the genital tract, it would appear that some local alteration in environment occurs—as a result of intercourse, instrumentation, or menstruation—which favours its survival and endows it with pathogenicity.

The Relapsing Case

This is a vexatious mystery. Of the 219 cases of trichomonas vaginitis no fewer than 50 (22.8%) relapsed while still under observation, and a longer follow-up would reveal a great many more. This relapse rate is significantly higher than in cases of monilial infection, in which it was 16.8% over a similar period. One is encouraged to believe in the existence of an encysted form which can remain dormant until conditions are once more favourable. So far only pseudocysts have been found, which cannot be cultured back into activity. Autogenous reinfection from inadequately treated sites, such as Skene's and Bartholin's glands, the urinary tract, and the cervix, is probably often responsible.

Attention has been directed to the cervix, and Table V shows the association of cervical lesions in both trichomonal and monilial cases. Somewhere between one-quarter and one-third of the cases had some clinical evidence of cervical disease, and although it is usually hard to find trichomonads in the cervical canal, unlike the common finding of monilial spores there, the increased alkaline flow of cervical mucus alters the environment at least in the upper vagina. It would therefore seem reasonable to treat associated cervical lesions energetically, as is our practice.

TABLE V.—*Association of Cervical Lesions*

	T.V.	Monilial Infection
Erosion	43	20
Lacerated cervix and/or cervicitis without erosion	13	9
Cervical polyp	1	—
Erosion and polyp	—	1
Amputated cervix	1	—
	58 (26·5%)	30 (31·6%)

Relapses most often follow a menstrual period. Trichomonas vaginitis, moreover, is relatively uncommon after the menopause; in the present series there were only 13 cases. It is much less common than monilial infections as a cause of discharge in pregnancy, and both in pregnancy and after the menopause the disease is more readily mastered. These observations, taken together, encourage the view that recurrent menstrual blood favours the persistence of the infection.

On this basis we found that in favourable cases it was possible to restrict treatment to the menstrual and immediate post-menstrual phases of the cycle, thereby allowing the patient a welcome respite during the greater part of the intermenstrual phase, provided that smear examination was satisfactory in the post-menstrual week. This suppressive treatment is continued over a series of at least three menstrual periods.

Diagnosis of Trichomonas Vaginitis

The discharge is fluid, purulent, acid to litmus paper, and often contains little gas bubbles. In acute cases the vulva is inflamed and tenderness may hamper examination. The vagina may be diffusely reddened and lustreless, or there may be scattered red spots, particularly in the fornices and on the portio vaginalis of the cervix. This punctate vaginitis is better demonstrated by swabbing with hydrogen peroxide, whereupon the white froth tends to adhere to the spotty areas.

Antiseptics and lubricants are neither necessary nor advisable before collecting a specimen with a platinum loop for microscopy. A fresh wet preparation, using a small drop of normal saline on a moderately warmed slide and covered with a coverslip, is examined immediately, as the parasite is more easily recognized while still actively motile. The size of the organism is comparable to that of a leucocyte, and it is necessary to use the $\frac{1}{4}$ objective to identify the rapidly moving flagella and undulating membrane.

From both cervix and vagina wet and dry specimens are collected for laboratory confirmation, the former in sterile pipette tubes or already mixed with saline, and the latter as smears. Smears are also taken from the urethra. Throat swabs are not satisfactory because of drying. Delay in examination often results in failure to detect both trichomonads and gonococci because of the overgrowth of other bacteria, and in the case of the trichomonads motility may have ceased owing to cooling.

The importance of examining the fresh wet specimen immediately in the clinic and without relying exclusively on subsequent laboratory diagnosis is emphasized in Table VI.

TABLE VI.—*Need for Both Clinic and Laboratory Diagnosis of T.V.*

T.V. found in both clinic and laboratory	87
T.V. found in clinic but not in laboratory	94
T.V. found in laboratory but not in clinic	16
T.V. found in clinic and no laboratory examination made	21
No information	1
	219

Pus/Squame Ratio as an Index of Severity of Infection and Progress.—Although trichomonads can be found in vaginal secretions in all three grades of the Schröder classification, ranging from high acidity and the almost exclusive presence of Döderlein's bacilli in Grade I to the least acid secretion and mixed bacteria, mainly pyogenic, in Grade III, it is in the latter grade that their presence denotes significant infection. A very simple test, now standard practice at Chelsea, is to make a rough estimate of the ratio of pus cells to squamous cells in a saline-drop preparation examined straight away under the microscope. For ease of comparison these ratios are expressed in fractions of 10. For example, a pus/squame ratio of 0/10 signifies very satisfactory progress, a healthy vaginal state, and a good prognosis, whereas a pus/squame ratio of 8/2 is definitely unfavourable, regardless of the actual number of parasites seen, and it often presages a symptomatic relapse, usually after the next period.

Monilial Infections

As causes of vaginal discharge the yeast fungi are nowadays increasingly recognized. The yeasts include the *Candida* (*Monilia*) parasites, of which there are many species, but of these only *Candida albicans* is pathogenic in humans. It may infect the mouths of babies, the external skin, the nail-folds, and the respiratory tract, as well as the cervix and vagina. It can be dormant in the genital tract for long periods and be found on routine examination of patients without symptoms. When the patient, however, is afflicted she develops a discharge which is either flaky, like damp bread, or glairy. Pruritus vulvae is often out of all

proportion to the amount of discharge, and vulvitis and secondary eczematization occasionally reduce the patient to a state of sleepless misery.

The organism thrives in a highly acid medium. Its association with pregnancy is therefore common. Glycosuria, whether diabetic or not, also favours its growth. Of our 95 cases of moniliasis, six were pregnant, and a higher pregnancy incidence would have been shown save for the fact that this hospital does not deal with midwifery.

The clinical appearances often suggest the diagnosis, which, however, can be made with certainty only from stained smears from both vagina and cervix, when *C. albicans* will be seen under high-power magnification either as mycelial threads (Fig. 1), or more often as spores, particularly in cervical specimens.

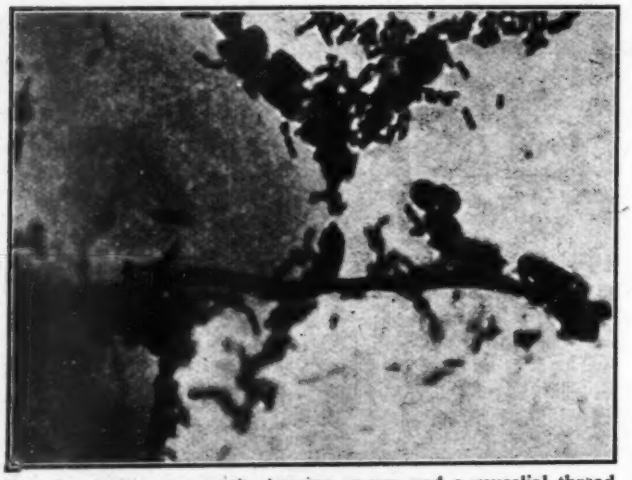

FIG. 1.—Photomicrograph showing spores and a mycelial thread of *Candida albicans* in a case of vaginal thrush.

The resistant case with intense pruritus might well be investigated for gastric achlorhydria. Two of our cases were found to be lacking in this respect, and the response to treatment with dilute hydrochloric acid by mouth was dramatic (Figs. 2, 3, and 4).

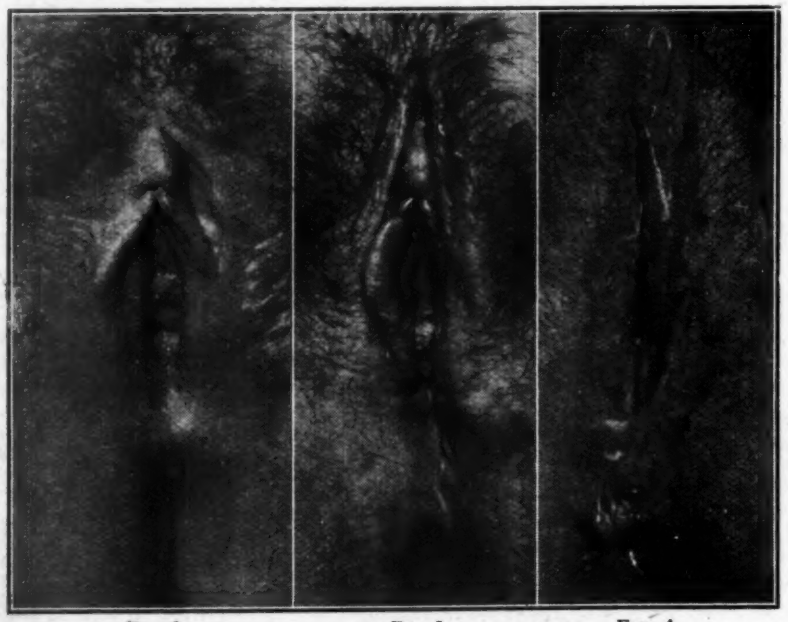

FIG. 2. FIG. 3. FIG. 4.

FIG. 2.—A case of vulvitis secondary to vaginal moniliasis; gastric achlorhydria. State of vulva before administration of dilute HCl by mouth. FIG. 3.—Same case as in Fig. 2, seven months later, HCl still being given. FIG. 4.—Same case, seven months later than Fig. 3, after conclusion of HCl.

The double infection of monilial infection and trichomonas vaginalis is by no means uncommon, and accounted for 7.7% of all our cases.

Miscellaneous Group

This group, as shown in Table I, consisted of 196 cases (33.5%). They are summarized in Table VII. The most significant figure is the last one, the number of patients

TABLE VII.—*Summary of Miscellaneous Group*

	No. of Cases	Percentage of Total
Cervical lesions (erosion, ectropia, laceration and infection, polyps)	86	14·7%
Postmenopausal state (natural, artificial, surgical)	20	3·4%
Gonorrhœa previously missed	1	
Syphilis " "	1	
Foreign body	1	
Recent colporrhaphy	2	
Prolapse	1	
No pathological condition found	84	14·4%
	196	

in whom no pathological condition was ever found, and in 49 of whom no trace of discharge was visible. A further five cases had a normal pregnancy.

Summary

It is necessary to distinguish between pathological vaginal discharges and vaginal moisture that may be no more than an exaggerated physiological phenomenon if the patient is to be spared treatment which is either inappropriate or unnecessary and therefore psychologically harmful.

In hospital practice there are very good grounds for segregating these cases into a special leucorrhoea clinic, in which they can be properly assessed. The clinical material of the "D" clinic of the Chelsea Hospital for Women is presented under four main groupings: (1) trichomonas vaginitis; (2) monilial infections; (3) double infections with *Trichomonas vaginalis* and monilia; and (4) miscellaneous conditions.

Cases amenable to surgical treatment are not included in the clinic, but are admitted for operation, and cases of venereal disease are also referred elsewhere.

The trichomonal cases form the hard core of the clinic, not only because they are common but because relapse is frequent (22.8%), and various sources of infection are reviewed, particularly with regard to sexual intercourse or attempts thereat. Over one-third of the cases quoted were unmarried, and a significant number contracted the infection as a result of their indiscretions.

The need for examination of fresh wet specimens is illustrated, and the importance of the ratio of pus cells to squamous cells is presented as an index both of prognosis and of progress under treatment. The well-known tendency to relapse after a menstrual period encourages a new approach to the timing of treatment.

EMPHYSEMA*

BY

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Knowledge and understanding of emphysema has advanced considerably during the last two decades chiefly as the result of the work of Christie (Christie, 1934, 1939, 1944a, 1944b; Meakins and Christie, 1934), the Rochester workers (Hurtado and Boller, 1933; Hurtado and Fray, 1933; Hurtado *et al.*, 1933; Hurtado *et al.*, 1934), McMichael (Aslett *et al.*, 1939; McMichael and Sharpey-Schafer, 1944), and Cournand and his colleagues (Cournand *et al.*, 1939; Cournand and Richards, 1941; Bloomfield *et al.*, 1946; Baldwin *et al.*, 1948, 1949). They have thrown a flood of light on the mechanism of emphysema, but its cause remains largely unknown and we still have no effective treatment to offer its victims. Emphysema is regarded as a natural consequence and an inseparable part of long-standing bronchitis or asthma. The usually accepted explanation of this association is that the emphysema results from chronic cough, but this cannot be the whole cause; thousands of people smoke so excessively that they cough almost incessantly and yet their exercise tolerance remains reasonably good and their lungs objectively normal, while not infrequently we find patients whose emphysema has developed either quite suddenly after an attack of pneumonia or insidiously without any antecedent respiratory disorder.

The hypothesis that there is a genetic tendency to emphysema is sometimes utilized to explain such anomalies, but in 103 patients (76 males, 27 females) in whom hereditary factors have been assessed, apart from a few whose emphysema was primarily due to allergic asthma, only three gave any family history of respiratory disease. These 103 patients presenting clinically as cases of emphysema were observed in routine hospital practice over the past five years, and have been further investigated and followed in an endeavour to augment knowledge of the aetiology and natural history of the disease. They all had dyspnoea either at rest or on moderate exertion; none had any primary cardiac disease, anaemia, or obesity to which their poor exercise tolerance could be ascribed; and all presented unequivocal physical signs of emphysema.

Aetiological Factors

The various aetiological factors in these 103 cases are summarized in Table I, from which it will be seen that chronic bronchitis was by far the most important, being dominantly responsible in 50 (49%) of the cases studied; 41 (82%) of these 50 were males. Some of these had developed bronchospasm, which no doubt aggravated the emphysematous process, but they were all primarily bronchitics. In one the bronchitic tendency was associated with kyphoscoliosis, in another with chronic nasal sinusitis, and in two others it developed after an attack of whooping-cough; in the remainder no cause was apparent. Nearly every patient smoked heavily, and it seems probable that this was an aggravating influence, because we have shown elsewhere that smoking is associated with a diminution in ventilatory efficiency (Whitfield *et al.*, 1951a). It is remotely possible that emphysema may in such cases be the primary disorder and chronic bronchitis a complication, but the history of cough and sputum so often precedes by many years the advent of dyspnoea that such an explanation is unlikely in the extreme.

TABLE I.—*Apparent Major Aetiological Factor in 103 Cases of Emphysema*

Aetiological Factor	Number			Age	
	Total	Male	Female	Mean	Range
Chronic bronchitis ..	50	41	9	52	35–80
Asthma	19	8	11	39	15–62
Pneumonia	10	5	5	57	38–74
Being "gassed" in first world war	9	9	—	58	52–64
Sulphur dioxide	1	1	—	60	—
Silicosis	3	3	—	54	52–56
Bronchiectasis	7	6	1	44	31–60
Primary emphysema ..	4	3	1	52	41–64

The second largest group comprised 19 (18%) cases of asthma (11 females and 8 males). Of these, six had a superadded bronchitic element. The mean age of the bronchitic group was 52 while that of the asthmatics was 39. Emphysema due to asthma therefore occurs at an earlier age than when it originates from bronchitis, and, while the former is more commonly encountered in females, bronchitic emphysema is largely a disorder of males.

Another group comprised 10 patients (five males and five females) who had no respiratory symptoms until an attack of pneumonia, after which their exercise tolerance was permanently reduced and they developed either a productive cough or a tendency to asthmatic attacks. It might reasonably be supposed that some recognizable permanent change such as bronchiectasis had developed in the lungs as a result of the pneumonia, but the chest radiographs showed no evidence of this. Seven other patients who had suffered from emphysema for some years developed attacks of pneumonia and thereafter their exercise tolerance was very much less. Two other patients suffered a similar deterioration following the occurrence of a spontaneous pneumothorax, though in both cases the lung re-expanded satisfactorily. It seems, therefore, that any condition which temporarily throws added strain on lungs already damaged by emphysema produces a further deterioration in their ventilatory efficiency which persists indefinitely; but why an attack of pneumonia will sometimes produce emphysema in lungs which were previously normal cannot be explained. The pneumonic episodes in these 10 cases occurred at ages varying from 13 to 69, with a mean of 39.

Nine of the male patients studied were gassed in the first world war and thereafter had a productive cough and exertional dyspnoea, though previously they had had no respiratory symptoms. It is thought that this is a possible aetiological factor in males who at the present time are becoming seriously disabled by emphysema. In one other male the aetiology was somewhat similar, respiratory disability dating from exposure to a high concentration of sulphur dioxide fumes.

In three other males who appeared clinically to be cases of emphysema due to chronic bronchitis, chest *x*-ray films revealed some silicotic mottling as well as gross emphysema, and inquiry into their past occupations showed that they had been engaged in work which exposed them to pneumoconiotic hazard.

Seven of the patients (six male and one female) were found to have a considerable quantity of purulent sputum, and bronchography revealed bronchiectasis, which was probably an important cause of their emphysema.

Four of the patients were of particular interest, as their emphysema had developed without any apparent cause. Three of them were males and one was a female, and in each case symptoms had begun in early middle life. Two of the patients developed pulmonary heart failure from which one died whilst under observation.

Patients suffering from chronic pulmonary tuberculosis commonly have some degree of emphysematous change in

*Based on an Address to the Birmingham Division of the British Medical Association on March 11, 1952.

their lungs. No such patients were included in this series, as it was desired to avoid any possibility of getting tubercle bacilli in the spirometers.

A further aetiological factor that must be considered is age. It has been shown (Kaltreider *et al.*, 1938; Whitfield, Waterhouse, and Arnott, 1950) that in normal subjects there is a progressive diminution in ventilatory efficiency with advancing years, and we are all familiar with the patient who first develops recurrent attacks of winter bronchitis together with exertional dyspnoea and the physical signs of emphysema late in life.

Symptoms and Signs

Emphysema itself has but two symptoms—dyspnoea and dry cough. These are the sole complaints of the victims of primary uncomplicated emphysema. At first the dyspnoea is noticeable only on exertion, but as the disease progresses it becomes evident at rest also.

In most cases the symptoms of the causal disorder are also present—for example, the sputum of bronchitis and bronchiectasis, or the paroxysmal dyspnoea of asthma. In some cases complications such as pneumonia, spontaneous pneumothorax, or pulmonary heart failure may render the symptomatology more complex.

The physical signs of emphysema are well known. The deep poorly expansile chest, kyphosis, hyperresonance, diminution or absence of cardiac and liver dullness, impalpable apex impulse, and the faint breath sounds with prolonged expiration are all evident in severe cases. Of all these the diminution of cardiac and liver dullness is perhaps the most reliable evidence of emphysema, but if cardiac failure supervenes the right ventricle enlarges, the cardiac dullness returns, and the apex impulse once more becomes palpable, usually well outside the mid-clavicular line. In many cases rhonchi indicate either an asthmatic aetiology or the presence of secondary bronchospasm. The presence of finger-clubbing suggests that bronchiectasis is the basic lesion. Many severely emphysematous patients are cyanosed, and this is particularly evident in those progressing to pulmonary heart failure in whom the chronic arterial oxygen unsaturation has resulted in polycythaemia of greater or less degree. The cyanosis in emphysema is relieved by oxygen.

Radiology

In hospital practice examination of the chest tends to rely more and more on the radiograph. It is therefore important that the radiological appearances in emphysema and their correlation with the clinical state should be widely known and clearly defined.

To this end 52 patients suffering from varying degrees of emphysema were assessed clinically, spirometrically, and radiologically (Whitfield, Smith *et al.*, 1951). All showed some radiological abnormalities, and there is no doubt that the presence of emphysema can be readily detected radiologically. Moreover, radiography is often the only means by which the primary pathology is revealed—for instance, in cases of silicosis.

Nevertheless the degree of emphysema can be determined more readily and more accurately by ordinary clinical assessment and by spirometry and the other ancillary investigations mentioned below than it can radiologically.

The most reliable radiological sign of emphysema is depression, flattening, and restricted respiratory excursion of the diaphragm. In this connexion it must, however, be added that bronchospasm limits diaphragmatic movement, and an immobile diaphragm has not the same significance if the patient is asthmatic at the time of screening.

Hypertranslucency of the lung fields is valuable evidence of emphysema and is very pronounced in those with an asthmatic aetiology. There are, however, many factors affecting the reliability of this observation. In an over-penetrated film normal lungs appear to be hypertranslucent, and in a "soft" film emphysematous lungs appear to have a normal translucency, while the presence of some degree of fibrosis or silicosis, or of congestion of the lung fields due to the supervention of heart failure, may obscure translucency. Increased brilliance of the lung bases as compared with the upper zones, and hypertranslucency and increase in the area of the retrocardiac and anterocardiac windows on the lateral film, provide more definite evidence of emphysema than does generalized hypertranslucency.

A dragging down of the hila on inspiration is good evidence of emphysema, but in advanced cases in which the diaphragm has become immobile this is no longer evident. Bullae and cysts are occasionally seen, but they are no indication of the severity of the disease, and usually tend to obscure the diagnostic issue by suggesting the possibility of a tuberculous infection or some other pathological condition. Kyphosis and apical rib crowding is often seen, particularly in males whose emphysema has resulted from chronic bronchitis, and a high maximum transverse diameter of the chest is present in some patients, most of whom are female asthmatics. Premature calcification of costal cartilage is not a feature of emphysema.

On the antero-posterior radiograph the heart shadow is characteristically small and is often described as "drop-like" or ptotic. The cardio/thoracic ratio is reduced and air is often visible between the diaphragm and the cardiac apex. All these changes probably result from the low diaphragm and the consequent more vertical position of the heart; they are particularly evident in asthmatic subjects. About two-thirds of the group studied showed enlargement of the pulmonary conus and one-fifth had enlargement of the right ventricle, but this radiological evidence of cor pulmonale was unrelated to the severity of the emphysema. With the development of pulmonary heart failure the heart becomes generally enlarged.

Other Ancillary Investigations

(a) Spirometry

Spirometry is valuable in the investigation of obscure respiratory disorders. In emphysema, however, the diagnosis is usually clear from the history, physical signs, and chest radiograph, but the alterations in lung volume give valuable information on the degree of damage to the lung tissue. Spirometry is carried out on a Benedict–Knipping spirometer, the vital capacity, inspiratory capacity, and expiratory reserve volume being measured in the usual way, and the functional residual capacity (and from it the residual volume) is determined by the constant-volume hydrogen dilution method described by McMichael (1939–42). Helium has now largely superseded hydrogen as the indicator gas because of the explosive properties of the latter.

The lung-volume changes which characterize emphysema are a diminution in vital capacity and an increase in the residual volume and in the ratio of the residual volume to the total capacity (Meakins and Christie, 1929–30; Hurtado *et al.*, 1934; Kaltreider *et al.*, 1938; Aslett *et al.*, 1939;

TABLE II.—*The Total Capacity and its Subdivisions in Normal Subjects Compared with that in Emphysematous Patients (Mean Absolute Values in Litres)*

Division of Lung Volume	Males			Females		
	Normal (64)	Mod. Emphysema (18)	Severe Emphysema (14)	Normal (32)	Mod. Emphysema (11)	Severe Emphysema (1)
Total capacity	5·74	6·17	5·74	4·28	4·87	4·35
Vital capacity	4·00	3·31	2·22	2·87	2·37	1·54
Inspiratory capacity	2·73	2·26	1·52	1·99	1·64	0·85
Expiratory reserve volume	1·27	1·05	0·70	0·88	0·73	0·69
Functional residual capacity	3·02	3·91	4·21	2·29	3·23	3·50
Residual volume	1·75	2·86	3·51	1·41	2·50	2·81

TABLE III.—*Mean Percentage Values of Lung Volume of Normal Subjects Compared with those in Emphysematous Patients*

Division of Lung Volume	Males			Females		
	Normal (64)	Mod. Emphysema (18)	Severe Emphysema (14)	Normal (32)	Mod. Emphysema (11)	Severe Emphysema (1)
Vital capacity / Total capacity	69·8	53·9	38·5	67·8	48·6	36·0
Inspiratory capacity / Total capacity	47·8	36·6	26·3	47·4	33·5	20·0
Expiratory reserve volume / Total capacity	22·0	17·3	12·2	20·4	15·1	16·0
Functional residual capacity / Total capacity	52·2	63·4	73·7	52·6	66·5	80·0
Residual volume / Total capacity	30·2	46·1	61·5	32·2	51·3	64·0

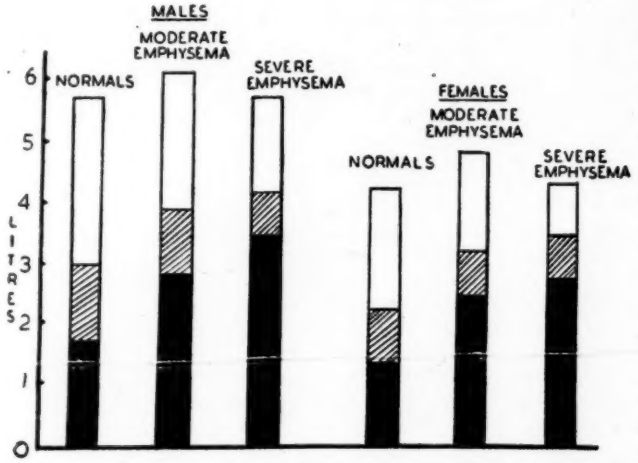

FIG. 1.—Lung volume of normal subjects compared with that of emphysematous patients. Residual volume—black. Expiratory reserve volume—hatched. Inspiratory capacity—white.

Christie, 1944a ; Baldwin *et al.*, 1949). They are well shown in Tables II and III and Fig. 1, which summarize the results of the determination of the total lung volume and its subdivisions in a series of normal subjects and a group of patients suffering from emphysema. The latter were divided into two groups—moderately emphysematous and severely emphysematous. The severely emphysematous were dyspnoeic at rest, while the moderately emphysematous were dyspnoeic only on exertion. It will be seen from the Tables that the lung-volume changes in emphysema increase with the severity of the disease.

Other spirometric features of emphysema are, first, a slowing of expiration (Fig. 2), and, secondly, an increased mixing time in functional residual-capacity determinations. In normal subjects in our apparatus the indicator gas is fully mixed throughout the lung–spirometer system within three minutes or less, but in emphysematous subjects seven or more minutes may elapse before mixing is complete. Normal mixing-times have to be ascertained for each design of apparatus, as small differences have a profound influence on mixing-time.

The mechanism of these changes is discussed below.

(b) Maximum Breathing Capacity

The maximum breathing capacity is the maximum amount of air that a subject can respire by voluntary hyperpnoea expressed in litres per minute. It is determined on a Benedict–Roth type spirometer from which the carbon-dioxide-absorbing canister and the one-way valves have been removed and smooth-bore 1¼-in. (3-cm.) tubing

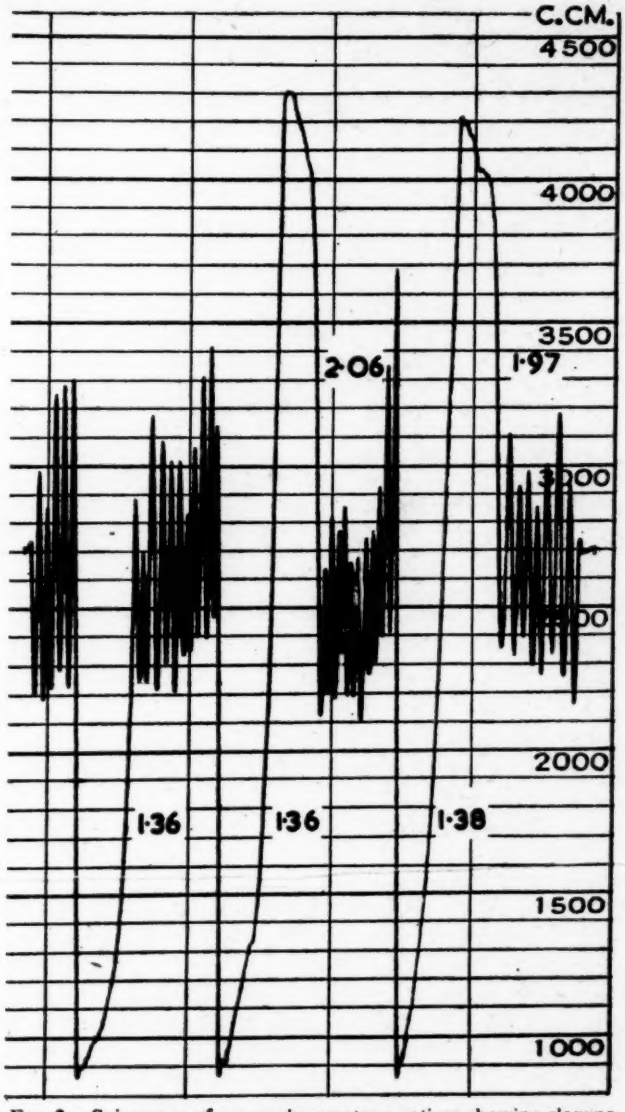

FIG. 2.—Spirogram of an emphysematous patient showing slowing of expiration.

substituted in order to diminish resistance. It is usually measured over a period of 15 seconds, as it is difficult to maintain a maximum state for a longer period. In emphysema the maximum breathing capacity is always reduced, and the degree of reduction is probably a more valuable guide to the severity of the emphysema than are the changes in lung volume (Gilson and Hugh-Jones, 1949 ; Cournand *et al.*, 1939). Another feature of the maximum breathing capacity in emphysematous patients is that it is carried out at or near the position of full inspiration and not at the resting respiratory level as in normal subjects.

(c) Oxygen Saturation and Carbon Dioxide Tension of the Arterial Blood

As the outstanding functional defect in emphysema is inadequate alveolar ventilation, alveolar tensions of oxygen become reduced and of carbon dioxide raised. Baldwin *et al.* (1949) have evolved an excellent functional classification of severity based on the oxygen content and carbon dioxide tension of the arterial blood. It comprises four grades:

(1) Arterial oxygen saturation above 92% and carbon dioxide tension below 48 mm. Hg following standard exercise. Despite ventilatory inefficiency, adequate alveolar ventilation is maintained by means of compensatory hyperventilation, consequently the arterial blood shows neither oxygen unsaturation nor carbon dioxide retention.

(2) Arterial oxygen saturation falls below 92% after standard exercise, but the carbon dioxide tension remains at the normal level of below 48 mm. Hg.

(3) Arterial oxygen saturation below 92% and carbon dioxide tension above 48 mm. Hg following standard exercise.

(4) The same as grade 3, with the addition of congestive cardiac failure.

Arterial puncture is with practice as easy and as safe as venepuncture. While the estimation of the oxygen content of blood is an easy procedure the measurement of carbon dioxide tension (Lilienthal *et al.*, 1946) is more exacting; however, oxygen content alone is of value in assessing severity.

Mechanism of Emphysema

Christie (1934) and Christie and McIntosh (1934) proved the loss of elasticity in emphysematous lungs by measuring the intrapleural pressure in three cases, in all of which it was either atmospheric or positive and unaltered by the induction of pneumothorax. Sections stained with elastic-tissue stains serve to confirm that one of the essential features of emphysema is an atrophy of the elastic tissue in the lung. The other important abnormalities revealed by histology are the breaking down of alveolar septa, with the formation of large spaces and the thinning and avascularity of the alveolar walls. Such changes are evident to the naked eye in the bullae that are so often to be seen at necropsy. The increase in the amount of air in the lungs at the end of a normal expiration (functional residual capacity) and at the end of a maximal expiration (residual volume) results partly from the loss of elastic recoil in the lungs and partly from the increase in alveolar space which is such a striking histological feature. This residual-volume increase inevitably reduces the vital capacity. The altered mechanics of breathing are an additional factor. Diaphragmatic and lower costal activity is reduced with increased activity of the upper costal and accessory muscles of respiration. In severe cases the entire thoracic cage may be seen to be elevated during inspiration as a rigid unit by the strong contractions of the accessory muscles. The diminished chest expansion and the reduction in maximum breathing capacity are further expressions of the abnormalities leading to limitation of the vital capacity. When the maximum breathing capacity becomes reduced to a level at which the ventilation at rest is equivalent to 30 or 40% of its volume (that is to say, the breathing reserve is only 60 or 70%) dyspnoea becomes evident.

Inspired air is slowly and inadequately mixed in the large saccular alveolar spaces and bullae. This is clearly shown in the prolonged mixing-times found in functional residual-capacity estimations. As a result the alveolar oxygen content becomes too low to saturate the haemoglobin, especially when oxygen demand is raised by exercise, and alveolar carbon dioxide retention occurs, with consequent raised blood carbon dioxide tension.

Although much remains to be discovered concerning the development of congestive cardiac failure in emphysema, some aspects of its physiological basis are known. Pulmonary hypertension seems to be an important factor in its causation. Cardiac catheterization has enabled studies of pulmonary artery pressure to be made in cases of emphysema both at rest and during exercise (Harvey *et al.*, 1951). Cases fall naturally into three groups: (*a*) those in which pulmonary artery pressure does not rise during standard exercise; (*b*) those with normal resting pressures which become elevated on exercise; and (*c*) those in which the pressures are high even at rest.

The reason for this pulmonary hypertension is to some extent the mechanical reduction of the pulmonary vascular bed and also the vasoconstriction which follows alveolar anoxia. This latter mechanism was uncovered by Motley *et al.* (1947) and is reversible; its operation may explain the precipitation of crises of cardiac failure by acute respiratory infection or prolonged asthmatic attacks.

Arterial unsaturation produces several changes which throw strain on the heart. Blood volume increases, a feature of this being an increase in the haematocrit value out of proportion to the haemoglobin increase. In other words, the circulation is flooded with hypochromic red cells. It is thus a characteristic of the polycythaemia of severe emphysema that it should result in a reduced colour index. This hypervolaemia is probably an important factor in producing the increased cardiac output, which, although to some extent compensatory, aggravates pulmonary hypertension and burdens the right ventricle.

The summation of these stresses increases the volume of blood remaining in the right ventricle at the end of systole, the right ventricular diastolic pressure rises, and in quick succession follow right auricular and systemic venous hypertension. Congestive failure thus results. It is of the utmost importance to realize that by correcting the acute attack of respiratory infection and the bronchospasm that set in train this vicious sequence the whole process can be reversed and the patient may make a remarkable, albeit temporary, recovery from acute cardiac failure.

Natural History

The degree of emphysema seems largely dependent on the severity and duration of the primary causal disease. Many whose bronchitis, asthma, bronchiectasis, or silicosis is moderate in degree, although their exercise tolerance is considerably reduced, live their natural span without any serious restriction of their activities and ultimately die from some quite unconnected condition. On the other hand, those whose primary disease is severe may become totally incapacitated by dyspnoea in the course of a few years and die soon from pulmonary heart failure or pulmonary insufficiency. A more common story, however, is of productive cough over a period of 20 to 30 years or more. At first the cough is present only after a cold, later it persists throughout the winter months, and as time goes by there is a progressive shrinkage in exercise tolerance, the cough and sputum are present all the year round, and the winters bring febrile respiratory episodes with increasing periods off work. Ultimately dyspnoea becomes so severe that the patient has to abandon his occupation, and in the course of the next few years he succumbs either in a pneumonic episode or from pulmonary heart failure or dyspnoea and anoxia—the syndrome of pulmonary insufficiency. Reference has already been made to the serious aggravating effect of pneumonic episodes and of spontaneous pneumothorax due to rupture of emphysematous bullae.

Such patients are particularly prone to attacks of pneumonia, and spontaneous pneumothorax may occur repeatedly, recurrences often being provoked by effort. Sometimes after a spontaneous pneumothorax the lung fails to re-expand. Such cases of recurrent or chronic pneumothorax are best treated by producing a chemical irritation of the pleura by the injection of iodized talc (poudrage) or silver nitrate. Pleurodesis is thereby effected and there is usually no further trouble (Brock, 1948). Alternatively, thoracotomy and suture of the affected area of lung is carried out.

Pneumonia may bring life to an end in two or three days either from dyspnoea and anoxia or by precipitating acute pulmonary heart failure. It is remarkable, however, how such patients can, with penicillin and oxygen, be rescued from the brink of the grave and survive another two or three winters. An attack of status asthmaticus is often the factor which terminates life in the emphysematous asthmatic, but even in the most desperate cases cortisone therapy may produce miraculous improvement.

Occasionally mental confusion develops in severe cases. This is sometimes associated with the presence of papilloedema, and such patients are often described as suffering from emphysematous encephalopathy. Although in the majority of patients showing mental symptoms there is some degree of pulmonary heart failure it is not believed that the confusion of mind and the papilloedema result from circulatory failure. The current belief is that they

are due to the anoxia and high carbon dioxide tension in the arterial blood producing dilatation of the cerebral vessels, a high cerebral blood flow, and a high cerebrospinal fluid pressure (Simpson, 1948; Donald, 1949; McMichael and Lennox, 1949; Davies and Mackinnon, 1949).

Treatment

While important aetiological factors such as bronchitis may prove susceptible to control, there is no curative treatment for emphysema itself, as the disease results from changes which are essentially degenerative in nature. Much can, however, be done to improve the lot of these unfortunate respiratory invalids with measures designed to control infection and relieve bronchospasm.

If sputum is profuse, and particularly if it is purulent, the amount of expectoration and the degree of dyspnoea and respiratory distress can be greatly reduced by postural drainage and by appropriate antibiotic therapy. The usual practice is to prescribe penicillin systemically and by inhalation without prior bacteriological examination of the sputum. Such practice is in most cases satisfactory and leads to marked reduction in the volume of sputum, but the inhalations sometimes give rise to a troublesome glossitis and soreness of the nasal and buccal mucosae which takes some weeks to clear up. Where bacteriological facilities are available it is better to withhold antibiotic therapy until the predominant organism in the sputum has been identified and its sensitivities have been ascertained. "Estopen" may be preferable to penicillin.

If the patient is conscious of wheezing or if rhonchi are audible on auscultation a diminution in dyspnoea and an improvement in exercise tolerance will result from bronchodilator drugs, though no benefit is likely in cases in which bronchospasm is absent (Whitfield, Arnott, and Waterhouse, 1950, 1951b). Ephedrine is the most effective and useful drug of this type, and is usually given in a dose of ¼–1 gr. (32–65 mg.).

The larger doses advocated by Herxheimer (1946) have not in our experience widened its range of usefulness or increased its efficacy, and they do produce distressing side-effects. Aminophylline is a valuable alternative, and is particularly useful where hypertension makes one hesitant to employ ephedrine. It is usually given in a dose of 0.2 g. orally. Various bronchodilator sprays, such as adrenaline (1 in 100) or "neo-epinine" can also be used with benefit in this type of case.

In patients with arterial anoxia oxygen will almost always produce marked relief from both cyanosis and dyspnoea. If human ingenuity could devise a portable form of oxygen therapy it would be a godsend to severely emphysematous patients. In advanced cases of emphysema with gross arterial anoxia and carbon dioxide retention the predominant stimulus in the chemical control of respiration appears to be the low oxygen tension and not the high carbon dioxide tension in the blood. In such patients oxygen therapy may, by improving the oxygen saturation of the arterial blood, depress ventilation, with further retention of carbon dioxide. Oxygen therapy should therefore be intermittent—for example, 45 minutes per hour—and a close watch kept for evidence of carbon dioxide poisoning (Davies and Mackinnon, 1949; Donald, 1949; Simpson, 1949; McMichael and Lennox, 1949).

The almost invariable aggravation of symptoms that emphysematous patients suffer during the winter months bears eloquent testimony to the effect of climate on the disease. The warmer and drier the weather is, the less troublesome are the respiratory symptoms. As regards tobacco, the less the patient smokes the better.

Breathing exercises have become a routine measure in a variety of respiratory disorders. It is difficult, indeed impossible, to assess their precise value in the treatment of emphysema. One's impression is that they are most beneficial in the younger age groups and in patients whose emphysema has an asthmatic aetiology. It is probably true to say that breathing exercises are worth while in emphysema if they can be carried out without exposing the patient to inclement weather and without incurring economic hardships. Some of the more intelligent patients learn the exercises and continue them as a daily ritual.

Although expectorants are still widely prescribed (Dunlop *et al.*, 1952) they have or should have virtually disappeared from hospital therapeutic practice, and are probably of no value in the treatment of respiratory disease. Indeed, codeine as a linctus is the only drug of the old guard that is likely to survive.

When polycythaemia and pulmonary heart failure develop, venesection often produces marked temporary relief. McMichael (1948) has suggested that ouabain may be of more value than digitalis in pulmonary heart failure, but, in general, digitalis, combined with mercurial diuretics, fluid and salt restriction, and measures to combat the primary lung disorder, remains current practice.

The dangers of morphine in status asthmaticus, pulmonary heart failure, and kyphoscoliosis (Daley, 1945) are well but not sufficiently well known. Morphine is a powerful respiratory depressant, and in such cases readily precipitates a fatal anoxia and carbon dioxide narcosis. The asthmatic, the kyphoscoliotic, and the patient with cor pulmonale dying from cardio-respiratory failure within a few hours of a dose of morphine is still a commonplace and the dangers of the drug cannot be overstressed.

While hope for the future must lie in the discovery of methods for the prevention or rapid arrest of the common cold—thus striking at the main root of bronchitis—and the control of bronchial asthma, advances in applied physiology have shown the rational therapy for the severe crises of emphysematous congestive cardiac failure. We now know how to use oxygen so as to gain the great advantages it offers without producing carbon dioxide poisoning. Thus seemingly abstruse and academic studies in respiratory physiology have yielded swift and rich benefits to the victims of emphysema.

Summary

Investigation of the aetiological factors in 103 cases of emphysema showed the apparent cause to be most commonly chronic bronchitis or asthma. Less frequently bronchiectasis or silicosis appeared to be the primary lesion. In some cases respiratory disability dated from an attack of pneumonia or from being gassed in the first world war. In four cases emphysema developed without any antecedent respiratory disorder.

Radiologically, depression, flattening, and diminished respiratory excursion of the diaphragm, and hypertranslucency of the lung fields, especially the bases and the anterocardiac and retrocardiac windows, are the most constant features of emphysema. The heart is characteristically small and the cardio/thoracic ratio reduced. A large proportion of cases show enlargement of the pulmonary conus, and in some the right ventricle is also enlarged.

Spirometry shows a decreased vital capacity and increased residual volume in emphysematous subjects. The degree of change is of some value in assessing the severity of the disease.

The maximum breathing capacity is reduced in emphysema, and this is a more reliable index of severity than are the changes in lung volume.

Emphysema produces a reduced oxygen content and an increased carbon dioxide tension in the arterial blood. These changes are of the greatest value in assessing the degree of lung disease.

The mechanism and natural history of emphysema and pulmonary heart failure are discussed.

Measures to control infection and relieve bronchospasm are the essentials of treatment. The value and dangers of oxygen therapy are pointed out and the lethal effect of morphine is stressed.

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INCIDENCE AND NATURE OF PUERPERAL PSYCHIATRIC ILLNESS

BY

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Many writers have expressed the view that no form of psychiatric illness occurring in pregnancy or the puerperium is a specific clinical entity. The general opinion seems to be that the ordinary stress and strains of pregnancy, operating in predisposed individuals, produce non-specific mental illnesses which are indistinguishable from other mental reactions and are due to the interaction of factors—the pregnancy being of psychological importance only. Brew and Seidenberg (1950) state that these disorders occur only in predisposed individuals, and disregard the possibility that a physiological or endocrine disturbance may be the primary activating factor.

As other surveys have been made only on patients who have been admitted to mental hospitals these conclusions are not justified; and as no psychiatric survey of women confined in maternity hospitals has been undertaken there is no evidence about the importance of alleged psychogenic factors.

The question has been considered afresh by studying the case records of all the women delivered at maternity hospitals in Bristol between January, 1938, and June, 1948, a period of 10½ years, the cases numbering about 37,000. Physical and psychological factors were noted in order to ascertain their importance. The incidence, nature, and outcome of mental reactions were studied, and all cases of mental illness related to the puerperium or pregnancy that were treated in Bristol Mental Hospitals during the same period were examined by me; thus there was a double check and control. The tables relate to these surveys. Reference has also been made to some other cases, which were not included in the surveys as they occurred in other years or outside Bristol.

This appears to be the first double survey made, although a report of the Rotunda Hospital, Dublin (quoted by Noyes, 1948) refers to 81 cases of unspecified psychiatric illness in 54,000 confinements.

In Bristol, about half the total number of pregnant women were confined in Southmead Hospital and Bristol Maternity Hospital, the remainder at home or in nursing-homes. Probably all the cases that required in-patient psychiatric treatment were admitted to the Bristol Mental Hospitals. The survey, therefore, is an almost exact record of the incidence of serious and prolonged puerperal mental illness in Bristol from 1938 to 1948.

In all cases included in this study there was a considerable degree of mental unbalance (such as depression or mania, clouding of consciousness, delirium, or thought disorder). Slight emotionalism and sleeplessness that cleared up in a few days were noted so frequently in the case histories that they cannot be regarded as important or even abnormal, and these were disregarded. Mental complications during pregnancy, occurring before confinement, were very rare, and unless otherwise stated the figures apply to puerperal mental illness only.

Incidence of Puerperal Reactions

During the 10½ years under survey 81,000 women were confined in Bristol, and 116 (1.4 per 1,000) of these were admitted to the Bristol Mental Hospitals. Approximately 37,000 were confined in the two maternity hospitals and 44,000 elsewhere. Mental illness was noted in 64 of the 37,000 (1.7 per 1,000), but in 27 of these it cleared up quickly, and only 37 (1 per 1,000) required mental-hospital treatment. Of the 44,000 women confined at home or in nursing-homes, 79 (1.8 per 1,000) were admitted to the mental hospitals.

Thus the incidence of mental illness was practically the same in both categories; but the incidence of admission to a mental hospital was greater in the case of women confined at home, probably because it is impossible to cope with even slight degrees of mental illness at the puerperium in the average house or flat. The maternity hospital cases that required mental-hospital treatment represent the more nuclear type of mental illness, not subject to quick remission.

Diagnostic Categories and Distribution

The cases were classified as follows: (1) manic-depressive psychosis; (2) puerperal depression; (3) schizophrenia; (4) mixed schizophrenic states; (5) neurosis; (6) confusion and exhaustion; (7) toxic delirium; and (8) other conditions (Tables I and II).

To facilitate evaluation of various factors they have also been reclassified as follows: (1) affective (including manic-depressive cases and puerperal depression); (2) schizophrenic (including mixed schizophrenic cases); and (3) other cases.

In the maternity hospital series nearly all cases in the schizophrenic group and the majority in the affective group required mental-hospital treatment, as these represented true

TABLE I.—*Distribution of Maternity Hospital Cases*

Diagnosis	No. of Cases	No. Admitted to Mental Hospital
Manic-depressive: manic, 0; depressive, 5	5	3
Puerperal depression	20	12
Schizophrenia	8	7
Mixed schizophrenia	4	4
Neurosis	4	1
Confusion and exhaustion	5	2
Toxic delirium	13	7
Others	5	1
	64	37

TABLE II.—*Distribution of Mental Hospital Cases*

Diagnosis	No. of Cases	Results
Manic-depressive: manic, 8; depressive, 14	22	All recovered
Puerperal depression	44	1 committed suicide. Remainder recovered
Schizophrenia	19	1 improved
Mixed schizophrenia	5	All recovered
Neurosis	6	" "
Confusion and exhaustion	5	" "
Toxic delirium	14	4 "died." Remainder recovered
Others	1	Recovered
	116	

psychotic illnesses likely to be prolonged. But only half the toxic and confused cases could not be managed adequately in the maternity hospitals, and these cases were rare towards the end of the period, probably because of the use of modern drugs (sulphonamides, penicillin, and the like) and improved obstetric practice.

Aetiological Factors

Number of Pregnancies.—There is no evidence that primiparae are particularly susceptible, except in schizophrenia, as the following figures show.

	Primiparae	Multiparae
Mental hospital cases:		
Mania and depression	30	36
Schizophrenia	14	10
Others	13	13
Maternity hospital cases:		
Mania and depression	10	15
Schizophrenia	9	3
Others	13	14

It was not uncommon to find psychotic illness following a second or third pregnancy, with no recurrence in subsequent pregnancies. In one case recurrent depressive illnesses occurred after the second pregnancy and each of three subsequent pregnancies. But on the whole there was no particular correlation, and—except possibly in schizophrenia—it is difficult to forecast subsequent attacks of puerperal illness.

Previous Mental Illnesses.—Among the 116 cases of the mental-hospital series the previous puerperal mental illnesses noted were:

Schizophrenia	1 out of 19
Manic-depressive cases	4 " " 22
Puerperal depression	3 " " 44

Other previous mental illnesses, not associated with childbirth, were:

Mixed schizophrenia	1 out of 5
Manic-depressive cases	5 " " 22
Puerperal depression	1 " " 44

These figures together give a total of 15 out of 116 cases with previous mental illness, or about 13%. Previous mental illness has been recorded where there was a history of treatment in a mental hospital or nervous illness of severity treated at home. In primiparae previous attacks of nervous exhaustion, not amounting to nervous breakdown, which seemed to have little effect on working capacity or function, were often reported; no doubt such a history indicates an over-solicitous individual anxious not to conceal anything of importance, and no significance can be attached to this alone. In some cases, not included in this series, a periodic affective illness developed after childbirth, with subsequent attacks related to menstruation.

Family History.—A history of mental illness in near relatives was obtained in 17 cases out of 116 (about 14.5%), as follows:

Schizophrenia	4 out of 19	6 out of 24
Mixed schizophrenia	2 " " 5	
Manic-depressive	2 " " 22	
Puerperal depression	8 " " 44	
Toxic states	1 " " 14	

Although family history in the psychoses is considerable, and in the schizophrenic group represents 25% of all the cases, a history of mental illness in the family was noted in many women confined without mental complications.

Age.—Mental reactions occurred during the whole childbearing period without predilection. Older women do not seem to be particularly vulnerable.

Multiple Births.—Among the 81,745 babies born in Bristol during this period there was one case of quadruplets as well as twins and triplets. Mental reactions were observed in only one case of multiple births, twins, the mother developing puerperal schizophrenia. It can be concluded that there is no predisposition in multiple births in spite of the obvious psychological factors involved.

Physical Illnesses.—It was striking how resistant pregnant women were to physical illness. The survey showed that in spite of serious diseases (rheumatism, heart disease, disseminated sclerosis, diabetes, and others) patients were successfully confined, and even if exhausted there was no prolonged mental breakdown. Many epileptics were confined during this period; in some there were no fits during gestation or the puerperium, and any relationship between epileptic fits and child-bearing seems to be inverse.

Psychological Factors.—The war covered half the period under review. During this time there was every combination of bad social conditions—psychological trauma, separation from husband, illegitimacy, bereavement, bombing, and housing difficulties. None of these factors, alone or together, appeared to exercise an important influence on the development of mental illness, and it is not possible to ascribe importance to psychological factors, apart from the personality of the patient and the family history. Karnosh and Hope (1937) suggested that there was an increased incidence due to external factors such as unemployment in the U.S.A. between 1927 and 1936, but Brew and Seidenberg (1950) noticed a drop during the war years in spite of the exceptional circumstances.

Personality.—The personality of patients admitted to the mental hospitals has been studied with care. Those who suffered from mixed schizophrenic reactions and puerperal depression were usually dependent, over-anxious, obsessional, and rigid in type. They looked forward to having a baby, but the character pattern of earlier life became much emphasized after the child was born, and, especially in puerperal depression, the personality structure resembled closely what is seen in involutional melancholia. Neurotic reactions were sometimes associated with immaturity, backwardness or even a degree of mental deficiency, or psychopathic personality. These personality types have been observed by other workers (Brew and Seidenberg, 1950).

Diagnostic Classification

All writers have had difficulty in classifying pregnancy reactions, and this may account for the great discrepancies in their incidence according to different surveys. The difficulty seems to be created by the special characteristics of some pregnancy reactions, and it is obviously unsound to force patients into a diagnostic category in order to prove that these are, or are not, specific to child-bearing. The present survey should help to clear up the situation.

Delirium and mental reactions to exhaustion and toxaemia following childbirth are becoming rare, but they are not different from those observed in other circumstances. True

manic-depressive episodes do not differ in characteristics or course from those not related to pregnancy, nor is the personality structure of the patient different.

In my opinion, there is a psychiatric entity—puerperal depression—which differs from the manic-depressive psychosis, and in many ways resembles involutional melancholia. The personality, as has been mentioned, is rigid and restricted, in contrast to that of the manic-depressive cases.

This illness, like puerperal schizophrenia, makes its appearance within the first fortnight after delivery, sometimes in the first week. In addition to depression, indecision, and lack of concentration, ideas of guilt and unworthiness are prominent, often with an abnormal attitude to bodily functions. There may be loss of interest in or rejection of the child, or the fear—sometimes realized—that it may be harmed. Motor agitation is prominent, and there is often great anxiety lest the compulsion to commit suicide or to injure the child may be obeyed.

The condition is extremely intractable even when treated by convulsion therapy, and if untreated may persist for a year or more after confinement. Eventual recovery or spontaneous remission is usual.

Schizophrenic reactions occur either as an acute schizophrenic illness, appearing in the first few days after confinement, with delusions, hallucinations, sometimes katatonic stupor, and irrational impulsive behaviour, or as a mixed psychosis with schizophrenic elements and marked affective disturbances, which are more often depressive, with ideas of guilt, though occasionally a maniacal picture is seen.

In the cases of mixed psychosis hallucinations are common, and in mixed depressive cases usually take the form of accusing or threatening voices. Visual hallucinations seem more prominent where there has been a difficult labour with loss of blood, physical illness, or perineal damage.

Treatment

Electric convulsion therapy is generally used in an affective psychosis as soon as the puerperal state permits. It is effective in puerperal depression and puerperal mixed schizophrenia; but the response is neither so good nor so certain as in non-puerperal affective illnesses. Relapses are common, and the illness is sometimes very prolonged. There is a certain danger of embolism if E.C.T. is given within a few weeks of delivery. Insulin treatment in addition to E.C.T. is usually necessary in mixed schizophrenia, and is normally tried in puerperal schizophrenia.

There are a certain number of reports of treatment of puerperal reactions with progesterone and other hormones (Blumberg and Billig, 1942; Schmidt, 1943). Experience at the Bristol Mental Hospitals shows that empirical hormone therapy is likely to be successful and that the most careful endocrine investigation and analysis should be carried out before any hormone treatment is attempted. This ideal is difficult to realize in puerperal cases, especially those suffering from schizophrenia, who are notoriously uncooperative and changeable. Nevertheless, hormone therapy applied on the endocrine findings and results of analysis has produced or assisted in producing remissions in some Bristol cases. In one case of mixed schizophrenia improvement could be correlated with changes in the hormone equilibrium of thyroid and adrenals, and the patient made a spontaneous remission at a time when the hormone investigations gave normal results.

It is as yet too early to say more than that there are indications that hormone therapy may be successful in puerperal reactions.

Response to Treatment.—In the series of 116 cases (Table II), 1 patient with puerperal depression committed suicide, 4 patients with toxic delirium died, and 18 out of 19 schizophrenics failed to improve. The remainder recovered eventually. In common with some other writers (Cruickshank, 1940), I have found the prognosis in schizophrenia to be practically hopeless, for in spite of early treatment only 1 out of 19 cases improved significantly. In mixed schizophrenia and in the affective psychoses (manic-depressive and puerperal depression) the response to electric-shock treatment was disappointing; although all these cases recovered eventually, relapses were common.

Addendum

A further series of 24 cases examined since 1948 has been analysed for comparison with the main series. The general conclusions are in agreement (Table III).

TABLE III.—*Second Series. Mental Hospital Cases*

Manic-depressive	2
Puerperal depression	13
Schizophrenia	3
Mixed schizophrenia	4
Neurosis	2
	24

Discussion

Investigation of the case histories of 37,000 women confined in Bristol maternity hospitals from 1938 to 1948 has failed to substantiate the assumption that psychological factors operating in predisposed individuals are responsible for puerperal mental illnesses. On the contrary, pregnant and puerperal women seem to be particularly resistant to the stresses and strains of life usually regarded as important in the production of neurotic and psychotic illness.

The majority of 140 cases of puerperal mental illness studied in two series of 116 and 24 were of puerperal depression and puerperal schizophrenia. In this paper the term puerperal schizophrenia excludes cases of mixed affective schizophrenia, which appear to belong more to the affective psychoses than the true schizophrenia. Puerperal depression and puerperal schizophrenia seem to be clinical entities causally related to the confinement, for psychiatric symptoms appear acutely within a few days of the event. As a general rule there is no indication of impending psychotic illness until after the child is born, and the patients look forward to the confinement and make adequate preparations for the baby.

There are points of resemblance between puerperal depression and involutional melancholia. The personality type and symptomatology are similar, and each illness follows an endocrine event and is prolonged.

Puerperal schizophrenia, which also appears soon after delivery, differs from other schizophrenia in several respects. Contrary to ordinary prognostic criteria, it is practically incurable. A good prognosis in schizophrenia is based on the rapidity with which treatment is given, the pre-psychotic personality, and the absence of endocrine abnormality. These factors should be in the patient's favour in puerperal schizophrenia; the personality is optimum—patients are sociable, have made good contacts and married; they are fertile and there are no obvious endocrine abnormalities; treatment is instituted more rapidly than in other kinds of schizophrenia, as these patients are invariably placed in a mental hospital within a few days of the onset.

Schizophrenia occurring during gestation is rare, and authors seem to agree that it is incurable. Patients suffering from chronic non-puerperal schizophrenia have been known to become pregnant and to be delivered of healthy babies without influencing the psychosis for the worse—sometimes for the better.

The acute alteration in the physiological and endocrine state associated with childbirth, operating on a susceptible personality or psychobiological organism, appears to activate these two grave psychiatric reactions—puerperal depression and puerperal schizophrenia. Vulnerability or predisposition is suggested by the positive family history ascertained in 25% of cases of schizophrenia in the survey.

The slow recovery and generally disappointing response to E.C.T. and insulin treatment in puerperal psychoses points to some serious endocrine imbalance; for there is much evidence that shock treatments operate through their effect

upon the endocrine equilibrium, affecting notably the adrenal cortex and thyroid (Hoagland *et al.*, 1950; Reiss *et al.*, 1951a, 1951b).

Changes in the uterine endometrium have been correlated with clinical improvement in some cases of puerperal psychosis (Delay *et al.*, 1947).

In many animals the placenta is eaten, and in some species if the placenta is taken away from the mother, as after caesarean section, she shows no interest in the offspring or maternal instincts. It may be that the sudden deprivation of the placenta with its hormone content produces a disturbance in the endocrine equilibrium, which, working on a predisposed constitution, produces the mental illness. Thus research on pathophysiological lines may provide the answer to the aetiology and treatment.

The question of terminating pregnancy to prevent another puerperal illness may arise, for mental illness is one of the most serious complications of pregnancy. At the very least it disturbs the mother–child relationship, disrupts the home, and makes a terrible start to family life. Admission to hospital is usually necessary, and shock treatment cannot be started early without the danger of embolism.

Normally there is no case for terminating pregnancy merely because a patient has had a puerperal psychosis. A history of a brief mental illness after confinement indicates that this was a neurotic illness and not a puerperal psychosis, and can probably be disregarded. In my opinion, termination should be considered seriously if less than a year has elapsed since recovery from a puerperal psychosis which ran a prolonged course and if there is also a bad family history of mental illness, and especially when there is in addition a history of more than one attack of puerperal psychosis.

It seems to be extremely dangerous for a patient who has recovered from puerperal schizophrenia to become pregnant again. The prognosis in this condition is so bad that another pregnancy can rarely occur, though it may happen in mixed schizophrenia. The only such case known to me had developed schizophrenia after the birth of twins. She was treated for about six months with electric shock and insulin, and was discharged improved. Shortly afterwards she became pregnant again, and there were mental changes. Pregnancy was therefore terminated by surgical induction. She again developed puerperal schizophrenia, was readmitted to hospital, and now—three years afterwards—has failed to show any improvement in spite of treatment.

Appropriate antenatal care can do much to reduce psychoneurotic and mild nervous reactions, especially in primiparae, but so far there appears to be nothing that can be done to prevent puerperal depression or puerperal schizophrenia.

Attacks of periodic depression may occur by coincidence during gestation. These respond to electric-shock treatment, which can be given in the early stages of pregnancy. In other cases the patient may have to be cared for in a mental hospital. She should be transferred to a maternity hospital for the confinement, to avoid the stigma on the child of having been born in a mental hospital; thereafter, the course of the illness is not usually different from that of ordinary depression.

Perhaps the most striking fact that has emerged from this survey is the way in which pregnancy seems to insulate and protect women from psychological and social stresses and strains of the greatest severity.

Summary

A psychiatric study of 37,000 women delivered in maternity hospitals in Bristol between 1938 and 1948, and of 140 cases of puerperal mental illness treated in Bristol Mental Hospitals in about the same period, has been made.

The incidence of mental reactions in the maternity hospital cases was 1.7 per 1,000, of which 1 per 1,000 required to be admitted to the mental hospital. The incidence of mental illness in the total number of women delivered in Bristol (81,000) was 1.4 per 1,000.

The distribution of different kinds of mental reactions has been noted. Apart from mixed schizophrenia and other affective and neurotic reactions, there appear to be two psychiatric disease entities causally related to child-bearing—puerperal depression and puerperal schizophrenia. Puerperal schizophrenia, in spite of favourable prognostic criteria, is rarely curable. Puerperal depression has some characteristics of involutional melancholia.

In schizophrenic reactions there was a positive family history of mental illness in about 25%. There seems to be a characteristic personality structure in puerperal depression. There are grounds for supposing that an endocrine condition is of causal importance in some puerperal psychoses.

Psychological stresses, physical illness, age, number of pregnancies, and multiple births were of no significance in the production of mental reactions.

Certain problems relating to the aetiology, management, and treatment of puerperal mental illness have been considered, and the importance of research into the endocrinology of the condition has been emphasized.

I wish to express my thanks to Dr. B. M. Murphy, who has helped me in the maternity hospital surveys; to the obstetricians at Southmead Hospital and Bristol Maternity Hospital for their co-operation and for allowing me to study their case records; and to the Records Departments at these hospitals for much assistance.

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Comparatively few Glasgow graduates proceed to industrial careers, according to Professor A. K. Cairncross, professor of applied economics, Glasgow University, writing in the *Glasgow Herald* of November 24. His conclusions are based on a sample of 300 graduates from the registers of the University for 1922 and 1952 and a sample of 100 from the register of 1868. A hundred years ago there were about 2,000 Glasgow graduates; now there are over 30,000. The overwhelming proportion have always entered one of the learned professions. Less than a century ago one in two became a minister of religion. By 1922 doctors led the field, with teachers in second place and ministers third, but now the doctors have been outnumbered by the teachers. The 1952 sample of graduates is made up of 94 teachers, 51 married women, 48 doctors, 27 engineers, 14 ministers, 10 university teachers, 8 lawyers, 7 chemists, and 41 others. The figures for doctors are worth closer examination. In 1868, for every three medical graduates who practised in Scotland four practised elsewhere; in 1922 those who practised in Scotland were easily in the majority; but by 1952 the proportion was back again to what it had been in 1868. Many medical students in the latter year came to Glasgow from other parts of the British Isles with every intention of leaving after qualification. In 1952 there were actually fewer Glasgow-trained doctors in Scotland than in 1922.

LIPODYSTROPHY

BY

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One of the earliest descriptions of lipodystrophy was given in 1885 by Weir Mitchell. He reported the case of a girl aged 12 who had lost all fat from the upper half of the body while the parts below the waist were unaffected. More than twenty years later Barraquer (1906) reported a similar case. Pic and Gardère (1909) described a patient with fat atrophy of the face and upper part of the body in association with fat increase over the pelvis and legs. Simons (1911) introduced the term "progressive lipodystrophy," and since then the disorder has sometimes been referred to as Barraquer–Simons disease. As the fat loss so typically affects only the upper half of the body, Gerhartz (1916) suggested that the condition should be called "lipodystrophia progressiva superior." Parkes Weber (1916) drew attention to the fact, however, that lipodystrophy was not progressive, since, after fat had been lost from the typical areas, there was no tendency to involvement of the lower half of the body, in which, on the contrary, abnormal accumulation of fat might occur, particularly in women of middle age. Marañón and Soler (1926) suggested the term "cephalo-thoracic lipodystrophia."

While the typical clinical picture of lipodystrophy is one of great loss of fat from the upper part of the body, producing a characteristic facies and abnormal prominence of muscle such as to give in women an appearance of masculinity, there are certain exceptions. A few cases are reported (Smith, 1930; Horton and Emmett, 1932; Bigler, 1939) in which the lipodystrophy affected the legs, the upper half of the body remaining normal. Moreover, a recognized form of the disorder is that described by Laignel-Lavastine and Viard (1912) in which the fat atrophy in the upper half is of less degree than in the classical type and may appear after adiposity of the lower half, always a prominent feature in this type, has developed. This state may be regarded as intermediate between typical lipodystrophy and the relatively common condition in which adiposity affects only the lower half of the body, the upper half remaining normal. This latter condition, in which there is no fat atrophy, appears as a characteristically feminine tendency and is often superimposed on the typical case of lipodystrophy. It cannot be regarded as a form of lipodystrophy, since this term is used to define a clinical state characterized by fat atrophy and in which adiposity of the lower part is not an essential feature. Nevertheless such cases have been so regarded by some authors. Christiansen (1922), referring to 15 cases seen by him, divided them into two groups, one showing the fat atrophy of the upper part of the body, the other occurring particularly in women about the menopause in whom the only abnormality was obesity confined to the lower part of the body. It would appear that in the latter group the diagnosis of lipodystrophy is unjustifiable, although it seems probable that some other observers have included such cases in their series, as, for example, Marañón and Cascos (1930), who mention 50 "mild cases," without giving details.

Aetiology

More than 100 cases of lipodystrophy have been reported. Parmalee (1948), reviewing the literature, found 95, and several cases have since been recorded. Examination of the case histories which have been published reveals that certain other features have often occurred in association with lipodystrophy. In the accompanying Table 74 of these cases, together with three new cases reported below, are summarized in order to show such additional characteristics. The sex of the patient is also shown, together with the age at the onset of the disorder when this has been recorded.

Summary of Reports of 77 Cases of Lipodystrophy

Author	No. of Cases		Age at Onset			Psychological Symptoms	Thyroid	Glycosuria
	F	M	Under 10	10–20	Over 20			
Weir Mitchell (1885)	1		1				?	
Osler (1895)	1		1					
Barraquer (1906)	1			1				
Campbell (1907)	1		1					
Pic and Gardère (1909)	1					1		
Simons (1911)	1			1			1	
Laignel-Lavastine and Viard (1912)	1				1		1	
Feer (1915)	2		2				1	
Gerhartz (1916)		1	1			1		
Herrman (1916)	1		1					
Parkes Weber (1916)	2		1	1		1		
Bossert-Rollett (1918)	1		1			1		
Spear (1918)	1		1			1		
Weber and Gunewardene (1919)	1		1					
Langmead (1920)	1		1					
Kraus (1921)	1		1					
Mirallié and Fortineau (1921)	1				1	1		
Smith (1921)	1			1			1	
Christiansen (1922)	1			1				
Irving (1922)		1	1					
Strauch (1922)	1			1		1	1	
Boston (1923)	2			2		1		
Reuben, Zamkin, and Fox (1924)	2	2	4			1	1	
Watson and Ritchie (1924)	4		2	1	1	1		1
Wolff and Ehrenclou (1927)	1				1	1		
Ziegler and Prout (1928)	2					1		1
Ziegler (1928)	5	2	1	3	1	7	5	3
Bilderback (1929)	1		1					
Currier and Davis (1930)	1				1	1		
Marañón and Cascos (1930)	2		1	1			1	1
Smith (1930)	1				1	1		1
Weber and Bode (1930)	1		1					
Capper (1932)	1	1	2			1		
Cockayne (1932)	1		1					
Hartson (1933)		2	2					
Cohen and Eis (1934)	2				2	2	2	1
Zondek (1935)	1			1				
Bigler (1939)	1		1					
Hansen and McQuarrie (1940)		1	1					1
Harris and Reiser (1940)		1	1					1
Patton (1945)	1		1					
Crosfill (1946)	1			1				1
Lawrence (1946)	1				1		1	1
Richardson (1946)	1				1			
Baxter *et al.* (1948)	3			3				
Igersheimer (1948)		1	1					
Barraquer Ferré (1949)	1		1			1	1	
Warin and Ingram (1950)	1	1	1		1	2		1
Otto (1951)	1		1					
Williams and Kelsey (1951)	1	1	2					
Present series	3		1	1	1	3		2
	63	14	40	19	13	30	16	15

The disease occurs much more often in the female subject than in the male; 63 (81.8%) were of the former sex. It begins most commonly in the early years of life. The onset was observed prior to the age of 10 in 40 (55.5%) cases, and in 19 (26.5%) between the ages of 10 and 20. It is noted that of the 14 male patients 12 (85.7%) developed the disease before the age of 10.

The aetiology of the disease is obscure, and various suggestions regarding its cause have been made. Several cases appeared to follow measles, but, as Bilderback (1929) pointed out, this is such a common infection in childhood that any relationship may well be coincidental. Other infections have been noted to occur before the onset of lipodystrophy, and Harris and Reiser (1940), reporting a case beginning in a child after a prophylactic injection of tetanus antitoxin, suggested the possibility that infection might act by affecting the central nervous system. Weber and Bode (1930) thought that lipodystrophy should be classed with the congenital developmental dystrophies, and Igersheimer (1948) has postulated congenital derangement of mesenchyme, a view regarded as "the most plausible" by Williams and Kelsey (1951). Weber (1932) contrasted the condition with Cushing's disease and suggested the possibility of hypofunction of pituitary basophils. Wolff and Ehrenclou (1927) were of the opinion that lipodystrophy was to be regarded as part of a congenital autonomic imbalance resulting from deranged central trophic control. In the view of Barraquer Ferré (1949) the essential lesion is in the hypothalamus, usually a hereditary degenerative process, perhaps accelerated in some cases by psychic trauma, and leading secondarily to hyperthyroidism, but also possibly developing as the result of a pathological lesion—"encephalitic, hormonal, metabolic, etc."—of that part of the brain.

In considering the cause of lipodystrophy it is necessary to take account of the disorders so often found in association with it. As Warin and Ingram (1950) have pointed out, endocrine or nervous disorders occur too frequently to be regarded merely as coincidental. Some authors have found that patients become nervous as a result of the embarrassment caused by their facial appearance. Such cases, in which nervous symptoms may be regarded as purely secondary, have been excluded so far as possible in the present review, yet it will be seen from the Table that 30 (39%) patients were reported as showing some psychological disturbance. Of the cases previously reported, the onset of the disease in three patients followed quickly on a severe fright in childhood. Nineteen were regarded as psychoneurotic, nervous, or emotionally unstable. Asthma or other psychosomatic disorder was present in three cases, one patient was reported sexually frigid, while in another there was a strong family history of neurosis. Parkes Weber (1913) observed that neurotic phenomena may usher in the disease, and Christiansen (1922) found that patients complained of vague neurotic symptoms and showed a tendency to profound depression. Ziegler and Prout (1928), inquiring into the neuropsychiatric aspects of lipodystrophy, reviewed 82 cases from the literature. They noted in eight cases a pronounced nervous or mental disturbance which might or might not have been due to worry about their appearance, concern about which, on the part of either the patient or friends, was present in another 32 in the series. They concluded that there was no psychiatric symptom-complex common to lipodystrophy, and no conclusive evidence that the integrity of the nervous system was affected. On the other hand, Cohen and Eis (1934) remarked on the frequency of the occurrence of nervous symptoms both in young and in adult patients, and noted that the latter were particularly prone to develop hyperthyroidism.

Thyroid dysfunction, varying from hyperplasia of the gland to thyrotoxicosis with auricular fibrillation, was observed in 16 (21%) patients. In addition to these the early case reported by Weir Mitchell suffered from "free perspiration," which may have been attributable to hyperthyroidism. Thyroidectomy was performed in three cases without benefit (Ziegler, 1928; Cohen and Eis, 1934; Lawrence, 1946), while in another temporary improvement after operation was soon followed by relapse. Lawrence's patient, who never exhibited any signs of Graves's disease, showed a remarkably high B.M.R., which continued to be raised after operation, even when she developed hypothyroid symptoms requiring thyroid for their relief. It was suggested that the high rate of metabolism was more akin to the increase found in leukaemia, and that possibly the histological changes in the thyroid might be secondary. Marañón and Soler (1926), who do not give reports of individual patients (hence not included in the Table), state that 8 out of 10 of their cases suffered from hyperthyroidism, while Marañón and Cascos (1930), referring to a large series of cases of lipodystrophy, note its occurrence "especially in hyperthyroid women." Christiansen (1922) reported that 2 of his 15 cases suffered from myxoedema.

In a large proportion of cases disturbance of carbohydrate metabolism has been reported. Eight patients were found to have diabetes, although in several this was mild; another had a high fasting blood sugar; and another had impairment of glucose tolerance. In addition to these, one patient showed a "lag" curve and two were reported to have renal glycosuria. In the remarkable case described by Lawrence, diabetes and lipodystrophy were associated with gross hepatomegaly, marked insulin resistance, and little tendency to develop ketosis. Two other cases of similar nature have been recorded (Ziegler, 1928; Hansen and McQuarrie, 1940), but in none other is there mention of liver enlargement. MacNeal (1947), however, states that hepatomegaly often accompanies progressive lipodystrophy in children. In most cases diabetes was noted within 10 years after the beginning of the fat loss, but in Lawrence's patient the diabetes preceded it. On the other hand, lipodystrophy may be present for long periods without evidence of diabetes developing. In approximately one-fifth of the cases reviewed lipodystrophy had persisted from 15 to 29 years, but in only two of these was diabetes noted.

Menstrual function seems to have been undisturbed in most cases. Hypertrichosis may occur (Boston, 1923; Reuben *et al.*, 1924), but, despite the appearance of masculinity often mentioned, no abnormality of distribution of pubic hair has been reported.

Three cases are described below. These show the typical features of lipodystrophy together with certain other characteristics less commonly encountered.

Case 1

This patient was a married woman aged 52. Loss of fat of the face began at the age of 25, and was first observed soon after she had had a severe fright. Fire had broken out in her home and, unable to get downstairs, she had to escape by jumping out of a window. The face was first involved, but gradually in the next two years the neck, arms, and upper trunk became thin. The lower part of the body remained normal until after the age of 40, when she started to gain much weight round the buttocks and thighs. She gave no history of illness prior to the onset of lipodystrophy. She was married at the age of 22, and has had two children. The first was born when she was 23, and the second when she was 28. Menstrual periods were regular until they ceased three years ago. She was concerned

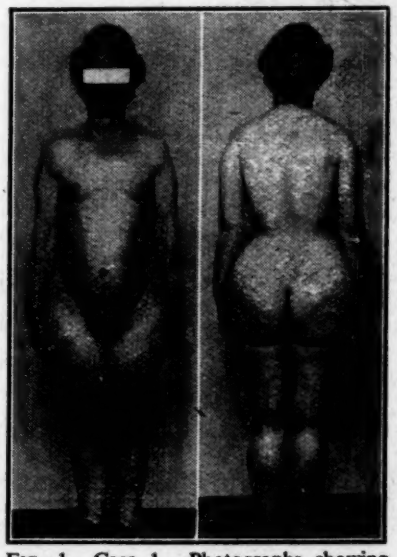

FIG. 1.—Case 1. Photographs showing thinness of face, lack of adipose tissue in arms and trunk, and pronounced adiposity of buttocks and thighs.

about the obesity below the waist, but did not seem ever to have been disturbed by the emaciated condition of her face. She had no other complaint, but on examination she was found to have severe glycosuria, and it transpired that she had experienced thirst for some months.

The thinness of the face was very striking, the complete absence of fat showing up the musculature, and there was general lack of adipose tissue in the arms and trunk. Below the waist the adiposity of buttocks and thighs was very pronounced (Fig. 1). The liver was enlarged 3 in. (7.5 cm.) below the costal margin. A glucose-tolerance test showed a fasting blood sugar of 242 mg. per 100 ml., rising to 392 mg. at one hour, and falling to 298 mg. at two hours. Glucose-insulin tolerance test (6.2 units of insulin intravenously with 52 g. of glucose orally) gave the following results: fasting blood sugar, 259 mg. per 100 ml.; 20 minutes after insulin, 283 mg.; 30 minutes, 313 mg.; 45 minutes, 307 mg.; 60 minutes, 343 mg.; 90 minutes, 303 mg.; 120 minutes, 243 mg. This indicated a moderate but not complete insulin-resistance.

On a restricted diet she has lost 9 lb. (4 kg.) and the circumference round the hips has diminished by 4 in. (10 cm.). On this diet the glycosuria has been kept under control.

Case 2

A single woman aged 37 lost her mother when she was aged 8 and is said to have been greatly upset by the bereavement. Soon afterwards she became thin, first in the face and later in the arms, and was taken to the doctor by her grandmother, who feared that the emaciation was due to serious illness. The patient herself did not worry about this condition, and when told she was thin would point to her legs, which remained normal. After the initial loss of fat in the upper part of the body she remained unchanged for years. Recently she has been gaining weight, but this has all been "from the waist downwards." Menstruation began at age 14 and has been regular and normal. There have been no diabetic symptoms. In October, 1950, she experienced a choking sensation and became emotionally disturbed, weeping with little provocation. She was thought to be suffering from hyperthyroidism and was given methylthiouracil by her doctor, but although this had been taken for some months it appeared to have had little effect on her symptoms.

FIG. 2.—Case 2. Photograph showing absence of fat on face.

FIG. 3.—Case 2. Photographs showing absence of fat on face, neck, arms, and upper part of trunk, and adipose tissue below the waist slightly greater than normal.

Examination showed complete absence of fat on face, neck, arms, and the upper part of the trunk (Figs. 2 and 3). Below the waist, adipose tissue was slightly greater than normal. The absence of fat gave an appearance of muscularity, and even suggested masculinity. There was rather excessive growth of hair on the legs and slight upward extension of pubic hair. The pulse rate was normal and blood pressure 140/90. There was no palpable enlargement of the thyroid, but the B.M.R. was increased (+28, +37, +11, +19). Total plasma cholesterol was above normal (283 mg. per 100 ml.). The liver was enlarged 2 in. (5 cm.) below the costal margin. There was slight glycosuria. Glucose-tolerance tests gave the following results: fasting blood sugar (venous blood), 94 mg. per 100 ml.; 30 minutes after glucose, 101 mg.; 45 minutes, 125 mg.; 60 minutes, 146 mg.; 90 minutes, 176 mg.; 120 minutes, 139 mg. The fasting urine contained no sugar; there was a yellow reduction of Benedict's reagent after the test. The glucose-tolerance test was repeated after the administration of 6.1 units of insulin intravenously with the following results: fasting blood sugar (venous blood), 89 mg. per 100 ml.; 30 minutes after glucose, 102 mg.; 45 minutes, 157 mg.; 60 minutes, 180 mg.; 90 minutes, 184 mg.; 120 minutes, 136 mg. The curves are virtually identical and appear to indicate insulin resistance. Liver-function tests gave no evidence of disturbed function.

Case 3

A girl aged 18 started to put on weight eight months previously, and has gained 2 st. (12.7 kg.). All the increase of adipose tissue has been below the waist. Her buttocks and thighs have increased markedly. She stated that her arms had become thinner, but there was no obvious fat loss in the upper half of the body. Relative to the lower part of the body, however, this appeared thin. Clinical examination revealed no other abnormality. The thyroid was not enlarged and evidence of hyperthyroidism was not present. There was no glycosuria, and a glucose-tolerance test showed no abnormality. Menstruation was normal. Since the age of 14 she has had evidence of vasomotor disorder, her hands tending to swell and become blue, and she has been troubled with chilblains on her legs from that age. During the past year there has been very considerable emotional conflict with her father.

Discussion

The first two cases are typical examples of lipodystrophy and show the characteristic feature—almost complete loss of fat from the upper half of the body. Gross adiposity of the lower parts developed in the first case, but not until many years after the upper half had become thin, while in the second case the lower half of the body is only slightly fatter than normal. In contrast with these the third case showed rapidly developing adiposity below the waist with only slight evidence of thinning of the upper half of the body, and is of the type of Laignel-Lavastine and Viard.

The frequent association of lipodystrophy with emotional disturbance is borne out in the present cases. In the first the onset of the disorder followed sudden severe fright, a happening that has been noted previously, but thereafter no signs of emotional instability were evident. In the other two patients psychoneurotic symptoms were present. Attention has been drawn elsewhere (Murray, 1950) to the importance of emotional disturbance in continuing thyrotoxicosis, and this may explain the frequent development of thyroid dysfunction in the adult suffering from lipodystrophy. As mentioned above, thyroidectomy was performed in some cases without benefit. In Case 2 of the present series the B.M.R. was persistently raised and had not been influenced by the administration of methylthiouracil, and the patient was not considered to be suffering from thyrotoxicosis. This is comparable to the findings in Lawrence's (1946) case, although in the latter the elevation of the B.M.R. was much greater. Certainly in the former there was no indication for thyroidectomy, and had this been performed it seems probable that it would have been as unavailing as

in the cases previously reported. In this and similar cases some stimulus other than the thyrotrophic may be postulated as the cause of the raised B.M.R. Szego and White (1949) showed in mice that the growth hormone of the anterior pituitary caused an acceleration of fat metabolism with mobilization from depots and intense fatty infiltration of liver, and it is conceivable that such a factor as this may be involved. It would seem that the disturbance of thyroid function in these cases may arise from altered activity of the hypothalamus, in which, according to Barraquer Ferré, lies the essential lesion of lipodystrophy.

The impairment of glucose tolerance, often mentioned in case reports of lipodystrophy, may in some instances have been associated with hyperthyroidism. None of the cases of the present series were, however, of this nature, but two had glycosuria. Case 1 must be regarded as frankly, and Case 2 potentially, diabetic. Both patients had enlarged livers and were insulin-resistant. Similar findings are obtained in the obese type of diabetic in whom liver enlargement is not uncommonly present, and in whom, as Bearn, Billing, and Sherlock (1951) have demonstrated, insulin-resistance and fatty changes in the liver are found. Lawrence (1951), discussing that form of diabetes occurring in association with disturbance of fat storage, subdivided this into lipoatrophic and lipoplethoric types. "Lipoplethora" of the lower half of the body is often found in cases of lipodystrophy. If difficulty in fat storage is, as Lawrence suggests, the primary cause of the diabetes of the obese it is surprising that diabetes has not been much more commonly found in patients suffering from lipodystrophy.

In Case 1 the obesity of the lower half of the body was so great that, had there been no lipodystrophy in the upper parts, she would have been regarded simply as of the common type of obese diabetic. It is impossible to say whether inability to deposit fat in the upper half of the body resulted in diabetes becoming manifest earlier than would otherwise have been the case. Moreover, the factors involved in the production of the great enlargement of liver are unexplained. However, in Case 2 there was no obesity. Fat deposition below the waist had increased but was not excessive. Carbohydrate tolerance was impaired, but to a degree insufficient for a definite diagnosis of diabetes. But even at this stage there was considerable hepatomegaly. As already noted, liver enlargement was a prominent feature in three cases of lipodystrophy with diabetes previously reported. It seems probable that disturbance of liver function resulting in hepatomegaly may be associated with abnormalities of storage in fat depots, and that this may play an essential part in the development of insulin-resistant diabetes.

Summary

Three cases of lipodystrophy are reported. Two presented the classical features of the disorder, while the third was of the type described by Laignel-Lavastine and Viard, in which the loss of fat from the upper part of the body is slight but obesity below the waist is pronounced.

While the essential characteristic of lipodystrophy is fat atrophy, obesity of the lower part of the body is commonly found in association with it, developing particularly in women of middle age. Obesity affecting only the lower parts of the body appears to be a not uncommon feminine tendency. This may be a disorder akin to lipodystrophy; in the latter there is a loss of fat from the upper half of the body, and in the former failure to increase the fat deposits in these parts. The Laignel-Lavastine and Viard type of lipodystrophy may be regarded as a state intermediate between these two.

In a large number of cases of lipodystrophy there is a history of emotional disturbance which may or may not be persistent. It seems probable that it is on this account that thyroid dysfunction, evidence of which was found in 21% of recorded cases, is so apt to occur.

In the two cases reported which showed remarkable fat atrophy there was glycosuria, hepatomegaly, and insulin-resistance, but only in very few recorded cases of lipodystrophy have similar findings been observed. Since the essential feature of lipodystrophy is disturbance of fat storage it would be expected that if this was a cause of diabetes the latter disorder would be more commonly found in association with it. Attention is drawn to the liver enlargement in these cases and in others previously reported, and it is suggested that disturbance of liver function in association with abnormality of fat storage is an important factor in the production of glycosuria.

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The Royal College of Obstetricians and Gynaecologists has now issued its Annual Report for 1951. During the year 130 candidates passed the examination for Membership, and 325 the examination for the Diploma of the College. Twenty-one Members were admitted to the Fellowship during the year. The *Journal of Obstetrics and Gynaecology of the British Empire* is now owned by the College. A committee has been appointed to watch over the affairs of the journal, and Professor James Young remains in the editorial chair.

MEASUREMENT OF TISSUE COMPONENTS RADIOLOGICALLY

BY

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In carrying out a detailed growth study of children we require to know the rates of growth of different tissues. These are mainly bone, muscle, and subcutaneous fat. Anthropometric methods of measurement have limitations of accuracy, especially in the infant and younger child and in the measurement of subcutaneous fat. We therefore have experimented radiologically on this problem.

Up to the present the radiological method of determining the proportion of tissue components has been basically the same (Stuart *et al.*, 1940; Stuart and Dwinell, 1942; Files, 1943; Stuart, 1944; Reynolds, 1944, 1946; Stuart and Sobel, 1946; Reynolds and Schoen, 1947; Tanner, personal communication, 1952). This consists in taking an *x*-ray photograph of a limb, for example, with the tube at a long distance from the limb—between 6 and 8 feet (1.8 and 2.4 metres) (Fig. 1).

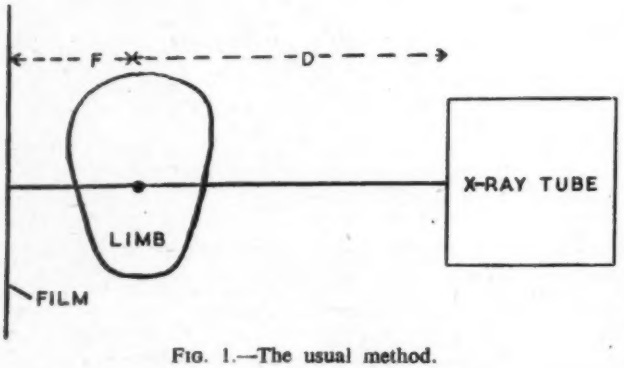

FIG. 1.—The usual method.

The limb–film distance is kept at a "known" constant—usually 4–6 in. (10–15 cm.) (F in Fig. 1). Because the distance of *x*-ray tube to limb (D in Fig. 1) is great, the subsequent distortion or magnification on the film of the actual limb is small and can be calculated. It is of the order of 2–4%. By allowing for this distortion the measurements of the various tissues can be found direct on the *x*-ray film.

This method has several disadvantages: (1) The *x*-ray tube must be capable of producing 200 mA and ideally 400 mA, because of the great distance from the limb. It is thus a very expensive piece of apparatus. The scatter is large. (2) The exposure time still needs to be of the order of ½ second; this is a source of trouble in the younger child, who does not wish to keep still. (3) The limb should be placed accurately at a known distance from the film. It is not possible to do this, however. The "centre" of the limb (which is where the arbitrary measurements are required to be taken) can only be guessed. There is therefore a source of error here.

Method

The following method is particularly suitable for the infant or younger child.

Two exposures are made on the same *x*-ray plate in a plane parallel to the plate, at a known and constant distance apart. The distance from the tube plane to the plate plane is kept constant. Under these conditions the picture shift is a function of the distance of the object from the plate. By selecting arbitrary values of this distance a graph, or table, may be obtained giving the distance of an object from the *x*-ray plate for any measured picture shift.

When the distance of the object is known its actual size may be accurately calculated by measuring the size of the picture of the object on the plate, and applying the simple formula $x = \frac{x'(K-d)}{K}$, where x = the true size of the object, x′ = its picture size on the plate, K = constant distance of the *x*-ray tube plane from the plate plane, and d = distance of the object from the plate as calculated above (Fig. 2). In our experiments K = 60 cm., and the *x*-ray tube shift = 8 cm.

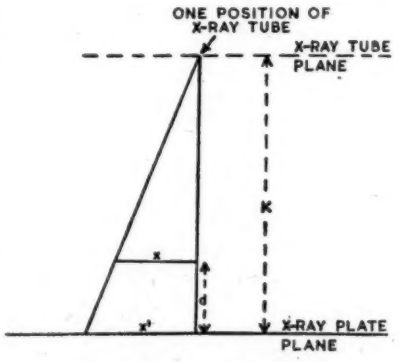

FIG. 2.—The new method.

In practice, the shifting of the tube, however quickly done, adds considerably to the time required for the limb to be kept still. Therefore we propose to use two tubes fixed a known distance apart, and energize them simultaneously. The advantages of this method are: (1) The tube (or tubes) need only be capable of producing 15 mA—the distance from limb to *x*-ray tube being short. The apparatus is therefore comparatively cheap. The scatter is small. (2) The exposure time is very short—of the order of ⅛ second. (3) It is not necessary to try to place the limb a known distance from the plate. A source of error is thus removed.

When the film is examined the picture shift is determined by measuring the distance between the two images of, say, skin at the point required for assessment. When this has been done the tissues are measured on the film from "one set" of images. This can be confusing, and good definition is required. By applying the formula the exact tissue measurements can be determined.

We carried out two experiments to test our method. First, rigid metal objects of known size were *x*-rayed. The mean error was 0.02 cm. Secondly, a completely sectioned lower limb in the mid-calf region from a human cadaver was *x*-rayed. The soft tissue and bones were measured at the same time by callipers directly on the specimen. The mean error of eight measurements was 0.11 cm. Measurements on the actual objects and the *x*-ray plates were carried out independently by the two experimenters, one doing all the measurements on the cadaver and metal objects, the other the measurements and calculations from the *x*-ray plates.

Errors have been calculated from the differences between the two sets of results obtained independently. The sources of error are in the actual measuring on the *x*-ray film and in positioning the limb. In the case of the calf, being generally circular in shape, this is comparatively easy to overcome, but in other parts it is important to be sure that a central perpendicular or horizontal axis is maintained parallel to the *x*-ray plate.

We intend to incorporate this method into the practical side of a growth study, as it will not only greatly increase our accuracy but provide us with permanent records of the tissue growth.

We are grateful to Dr. T. H. Hills and Dr. E. A. Miskin for many helpful suggestions.

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THE THERAPEUTIC RESPONSE OF SECONDARY ANAEMIAS TO ORGANIC AND INORGANIC IRON SALTS

BY

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In 1926 Starkenstein discovered that only ferrous iron is utilizable by the haemopoietic system. Since then inorganic ferrous salts have provided the standard form of ferrotherapy. In particular, ferrous sulphate has been widely used in various official and proprietary presentations. The *National Formulary 1952* informs us that there is need for only two oral preparations of iron in the treatment of ferro-sensitive anaemias. These are those containing either ferrous sulphate or iron and ammonium citrate.

Benstead and Theobald (1952), in their work on the incidence of anaemia in pregnancy, showed in their series of cases that in one group of patients 33%, and in another group 40.2%, found it difficult or impossible to tolerate ferrous sulphate tablets. They concluded that 30–40% of antenatal patients do not, in fact, consume these tablets when prescribed as routine in antenatal departments. It therefore seems that, although ferrous sulphate tablets are widely ordered, their therapeutic value, owing to gastric intolerance, leaves much to be desired.

Following their publication I wrote (Haler, 1952) that I was investigating the therapeutic effects of the organic ferrous gluconate in ferro-sensitive anaemias. The results are herewith appended.

Ferrous gluconate is the normal ferrous salt of D-gluconic acid; it is a dihydrate crystal and contains 11.5% of ferrous iron.

Staub (1949), Jasinki (1949), and others have shown that this salt is the most easily absorbed of all ferrous salts. It does not appear to produce gastric upsets. The following figures result from the decision to compare the therapeutic response of ferro-sensitive anaemias when treated with the standard inorganic iron preparations with those obtained from the use of ferrous gluconate.

The Investigation

The cases investigated are classified as follows:

Anaemia following	post-partum haemorrhage ..	25	cases
,, ,,	normal delivery	13	,,
,, ,,	illness	6	,,

TABLE I

Code	No. of Cases	Key	Daily Dosage of Available Iron
		Group A. Inorganic Iron Preparations	
A	5	Proprietary ferrous sulphate and folic acid in capsules	184 mg.
B	1	Proprietary ferrous sulphate capsules	184 ,,
C	11	,, ,, ,,	180 ,,
D	1	Tab. ferrous sulphate Co. *N.F.* " ..	180 ,,
F	1	Ferri dialysata	216 ,,
H	1	Proprietary saccharated iron for intravenous use	100 ,,
J	1	Proprietary iron and folic acid tablets	184 ,,
		Group B. Organic Iron Preparations	
I	23	Ferrous gluconate	105 ,,

The cases were selected at random, the average Hb value (King and Gilchrist, 1947; King *et al.*, 1947, 1948a, 1948b, 1948c, 1951; Macfarlane *et al.*, 1948; Donaldson *et al.*, 1951) over the series being 65%; organic and inorganic iron preparations were given to alternate cases. The organic preparation of iron was available as a liquid proprietary preparation which in addition contained aneurin hydrochloride, nicotinamide, and riboflavin in blackcurrant juice syrup, which also provided 5 mg. of natural vitamin C per drachm.

In Group A cases (Table I) supplementary vitamins were given to those patients in whom avitaminosis was suspected.

TABLE II

Case No.	Group	Hb Initial	Hb Final	Hb Increase	Hb Mean Daily Increase%	Total Fe++ Administered	% Fe++ Utilized	Coefficient
		Group A. Inorganic Iron Preparations						
1	A	62 (9·25)	90 (13·5)	28 (4·25)	1·16	4,416	19·02	16·4
2	A	70 (10·45)	92 (13·80)	22 (3·35)	0·54	7,554	8·7	16·1
3	A	80 (12·0)	86 (12·9)	6 (0·90)	1·2	920	19·6	16·3
4	A	68 (10·15)	80 (12·0)	12 (1·85)	1·5	1,288	28·0	16·45
5	A	32 (4·75)	41 (6·1)	9 (1·35)	1·0	900	30·0	30·0
6	C	52 (7·7)	74 (11·05)	22 (3·35)	2·2	1,800	36·0	16·4
7	C	60 (9·0)	76 (11·4)	16 (2·4)	0·67	2,880	18·8	28·0
8	C	54 (8·05)	68 (10·15)	14 (2·1)	0·67	3,780	11·1	16·6
9	C	70 (10 5)	90 (13·5)	20 (3·0)	0·57	6,300	9·5	16·7
10	C	68 (10·15)	90 (13·5)	22 (3·35)	0·43	8,820	7·5	17·4
11	C	48 (7·2)	72 (10·7)	24 (3·5)	0·84	5,580	13·9	16·6
12	C	68 (10·15)	82 (12·3)	14 (2·15)	0·5	5,040	8·3	16·6
13	C	34 (5·00)	76 (11·4)	42 (6·4)	0·875	8,640	14·5	16·7
14	C	58 (8·65)	84 (12·6)	26 (3·95)	0·74	6,300	12·4	16·75
15	C	60 (9·0)	78 (11·7)	18 (2·7)	0·47	13,680	4·0	8·5
16	C	50 (7·5)	58 (8·65)	8 (1·15)	0·53	5,400	4·5	8·5
17	B	76 (11·4)	80 (12·0)	4 (0·60)	1·0	736	16·3	16·3
18	D	48 (7·2)	70 (10·5)	22 (3·30)	1·0	7,560	8·8	8·8
19	F	45 (6·7)	75 (11·2)	30 (4·5)	1·4	4,536	13·9	10·0
20	H	41 (6·1)	58 (8·65)	17 (2·55)	3·4	525	97·0	28·6
21	J	55 (8·2)	82 (12·3)	27 (4·10)	0·77	6,440	7·9	10·2
		Group B. Organic Iron Preparation						
23	I	62 (9·2)	92 (13·8)	30 (4·6)	1·67	1,890	47·6	29·5
24	I	58 (8·65)	92 (13·8)	34 (5·15)	1·88	1,890	52·9	28·0
25	I	76 (11·4)	90 (13·5)	14 (2·1)	1·2	1,890	22·2	18·5
26	I	72 (10·7)	94 (14·1)	22 (3·4)	1·8	1,890	50·8	28·2
27	I	70 (10·5)	98 (14·85)	28 (4·35)	1·6	1,890	44·4	27·8
28	I	80 (12·0)	98 (14·85)	18 (2·85)	1·0	1,890	28·6	28·6
29	I	47 (7·0)	84 (12·6)	37 (5·6)	1·8	2,205	50·2	27·9
30	I	80 (12·0)	98 (14·85)	18 (2·85)	1·5	1,260	42·9	28·6
31	I	54 (8·0)	92 (13·8)	38 (5·8)	2·1	1,890	60·3	28·8
32	I	72 (10·7)	90 (13·5)	18 (2·8)	2·6	735	75·2	28·9
33	I	72 (10·7)	88 (13·2)	16 (2·5)	1·33	1,260	38·1	28·7
34	I	77 (11·5)	95 (14·2)	18 (2·7)	1·5	1,260	42·9	28·6
35	I	76 (11·4)	96 (14·4)	20 (3·0)	1·67	1,890	47·6	28·5
36	I	78 (11·7)	96 (14·4)	18 (2·7)	2·33	1,260	66·6	28·6
37	I	68 (10·15)	90 (13·50)	22 (3·35)	1·2	1,890	34·9	29·0
38	I	78 (11·7)	93 (14·0)	15 (2·3)	1·5	1,050	42·8	28·8
39	I	90 (13·5)	96 (14·4)	6 (0·9)	0·85	735	25·0	29·4
40	I	60 (9·0)	82 (12·3)	22 (3·3)	1·8	1,260	52·4	29·0
41	I	74 (11·05)	96 (14·4)	22 (3·35)	1·0	2,205	30·0	30·0
42	I	70 (10·5)	94 (14·1)	24 (3·6)	0·85	2,940	24·5	28·8
43	I	72 (10·7)	98 (14·85)	26 (4·15)	0·62	4,410	17·7	28·6
44	I	65 (9·7)	100 (15·0)	35 (5·3)	1·2	2,940	35·7	29·8
45	I	68 (10·15)	78 (11·7)	10 (1·55)	1·4	735	40·8	29·2

		Available Fe++/day
A	= "Plastules" with folic acid	184 mg.
B	= "Plastules" plain	184 ,,
C	= "Fersolate"	180 ,,
D	= Tab ferri sulph. co.	180 ,,
F	= Ferri dialysat.	216 ,,
G	= Ferri ammon. cit.	189 ,,
H	= "Ferrivenin"	100 ,,
I	= "Cerevon"	105 ,,
J	= "Folvite" with iron ("Folvron") ..	184 ,,

Assessment of the therapeutic response was based on the following factors: (1) total increase in grammes of Hb per 100 ml.; (2) average daily Hb increase per 100 ml. (taking 15 g. Hb as 100%); (3) the iron utilization coefficient, calculated on the basis that 30 mg. of iron is required to raise the Hb by 1%; and (4) the average number of treatment-days required to raise the Hb value to within normal limits. Routine haematological investigation was carried out before and during treatment, and the results were carefully recorded.

Study of the Therapeutic Response

Group A (Table II) shows the results of treatment in those cases treated with inorganic iron. The average total dosage of available iron administered was 4,900 mg. The average Hb increase in this group was 2.9 g. per 100 ml. It can therefore be deduced that the iron utilization coefficient for this group was 18.1. This approximates to the findings of Witts (1936) for the iron utilization coefficient of ferrous sulphate as 14. The mean daily Hb increase was 1.02%, which confirms the therapeutic response to be expected. The average period of treatment over this group was 21.7 days.

Graph showing group positions in relation to average daily haemoglobin increase.

In Group B the average total dosage of available organic iron given was 1,359 mg. The average Hb increase was 3.4 g. per 100 ml., indicating an iron utilization coefficient of 28.3. This compares favourably with the finding of Staub following his study of ferrous gluconate in tablet form, which showed an iron utilization coefficient of 22±5%. The mean daily Hb increase in this group was 1.49% and the average period of treatment 17.8 days.

The analysis of the haemoglobin response in both the groups indicates that the organic iron-treated group shows a remarkably constant iron utilization coefficient of 28.3. This compares with the inorganic iron-treated group, which shows an average utilization coefficient of 18.1. This increased haemoglobin response was achieved in a shorter period of time, and with a reduced overall dosage of iron.

An Interesting Case Noted During Study

Case 20.—A full report on this case of post-natal anaemia following post-partum haemorrhage is given, as iron therapy was started with intravenous iron and completed with the ferrous gluconate preparation. The findings were as follows:

	Date	R.B.C. (mill.)	Hb Haldane (%)	C.I.	M.C.D. (μ)	Retics. %	Retics. Total
Ferrivenin, 100 mg. daily ..	20/5/52	2·0	32	0·8	6·85	0·6	12,000
	23/5/52	2·1	34	0·81	6·8	0·6	12,000
Ferrous gluconate, 105 mg., available iron daily ..	27/5/52	2·5	41	0·82	6·85	0·45	10,000
After 5 days	31/5/52	3·12	58	0·92	6·9	1·4	43,000
„ 10 „	9/6/52	4·32	74	0·84	6·7	1·9	82,000

Tolerance and Side-effects

It is usually stated that ferrous sulphate tablets are well tolerated. I first learnt to doubt this when I was treated for anaemia arising during a severe pneumonia. My gastric experiences during that treatment led me to watch for other people's intolerance to iron. It has been found that quite 25% of out-patients treated with the standard therapy voluntarily discontinue treatment because they are unwilling or unable to tolerate the gastric side-effects.

The liquid ferrous gluconate has proved so effective that patients in the ward have asked to be taken off the tablets and to be put on to the "liquid tonic."

Summary

Of all the preparations used in this trial, the liquid ferrous gluconate preparation was far and away the most popular with patients, and produced a therapeutic response out of all expectations.

A study was made of the relative therapeutic values of organic and inorganic iron salts in the treatment of ferro-sensitive anaemia. The inorganic iron preparations provided ferrous sulphate in various presentations, the daily intake of available iron being approximately 180 mg. a day.

The organic iron salt administered was a proprietary liquid ferrous gluconate preparation giving a daily intake of available iron of 105 mg. a day, with the addition of aneurin hydrochloride, nicotinamide, riboflavin, and natural vitamin C which in the dosage given provided 15 mg. of ascorbic acid a day.

An evaluation of the therapeutic response indicates that the group treated with the inorganic iron salt showed a mean daily increase of 1.02% haemoglobin and an iron utilization coefficient of 18.1.

The group treated with the organic preparation showed a mean daily haemoglobin increase of 1.49% and an iron utilization coefficient of 28.3.

The period of treatment required to raise the haemoglobin value to normal limits was 21.7 days in the inorganic iron group and 17.8 days in the organic iron group. The average total dosage of available iron administered in the inorganic group was 4,900 mg. and in the organic group 1,359 mg.

I suggest that the organic iron salt ferrous gluconate seems to produce a more satisfactory haemoglobin response within a shorter period of time than that obtained by the well-known ferrous sulphate preparation.

I wish to acknowledge my indebtedness to my personal laboratory staff for their great and invaluable assistance with the laborious assessment of this mass of figures; to my secretarial

staff for their careful typing in this detailed work; to Messrs. Calmic for their generous supply of ferrous gluconate used in this test; to all those clinicians who have assisted so kindly in placing clinical material at my disposal; and, above all, to all patients who shared in this stimulating piece of laboriously built-up research.

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Medical Memorandum

Vasa Praevia

Vasa praevia may be defined as a condition in which the foetal blood vessels, unsupported by either umbilical cord or placental tissue, traverse the foetal membranes of the lower uterine segment in front of the presenting part. As a rule it is impossible to diagnose abnormalities of the placenta until after delivery. Vasa praevia is an exception to this rule, as on rare occasions the condition has been recognized before rupture of the vessels has occurred. It is a rare condition: a survey of the literature reveals only 52 recorded cases, and for this reason the following case is of interest as an example of an uncommon cause of stillbirth.

CASE REPORT

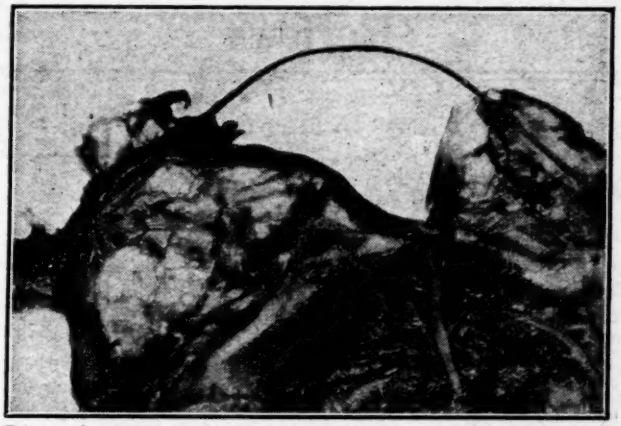
A primipara first attended the antenatal clinic on October 26, 1951. Her menses had always been regular, and her last menstrual period was on June 24. No abnormality was detected on examination, the height of the uterine fundus corresponding with an 18-weeks pregnancy. She remained well throughout pregnancy. On March 24, 1952, when she was 39 weeks pregnant, premature rupture of the membranes occurred at 5.45 a.m., and she noticed that the liquor was blood-stained. No foetal movements were felt after 6 a.m., and she was admitted to hospital at 9 a.m.

On admission she was having no pains, but was draining liquor which was mixed with a little fresh blood. The blood pressure was 140/80 and there was no albumin in the urine. On abdominal palpation the height and girth of the uterus were compatible with a full-term pregnancy. The lie of the foetus was longitudinal, and the head was deeply engaged. The uterus was not tender to palpation and foetal parts were readily felt. No foetal heart could be heard. On vaginal examination the cervix was partly effaced and one finger dilated. The membranes were ruptured and the vertex was presenting. No umbilical cord could be felt and the liquor was blood-stained. A diagnosis of revealed accidental haemorrhage was made.

Labour began at 1 p.m.; seven hours later the cervix was fully dilated. Throughout the first stage the loss of blood-stained liquor continued, and it was estimated that the total blood loss was about 120 ml. The mother had not felt any foetal movements, nor had the foetal heart been heard since admission. Forceps delivery was performed in the second stage of labour because of maternal distress. The infant was stillborn, weighing 7 lb. 2 oz. (3.2 kg.). No cord was felt on examination under anaesthesia. After delivery of the infant it was noticed that the umbilical cord was pale and that the umbilical vessels, particularly the arteries, contained very little blood. The puerperium was uneventful and the mother left hospital on the tenth day.

Placenta.—This was of normal size and the maternal surface appeared normal. There was no evidence of any retroplacental haematoma. A velamentous insertion of the cord was present, the umbilical vessels traversing the membranes for a distance of about 10 cm. before reaching the foetal surface of the placenta. One of these vessels, an artery, was divided in two by the rent in the membranes through which the baby had been delivered (see illustration).

Necropsy.—At post-mortem examination of the foetus the findings were compatible with foetal death due to anoxia consequent upon blood loss and interference with the foetal circulation. No other cause for death was found.



Edge of placenta, showing a velamentous insertion of the umbilical cord and vasa praevia. A small metal probe has been inserted into the lumen of the divided umbilical artery. (Owing to preservation of the specimen in formalin before photography, the membranes have shrunk.)

COMMENT

Velamentous insertion of the cord is almost a prerequisite for the occurrence of vasa praevia. Only very rarely may it be attributed to vessels running between the lobes of a multipartite placenta; to the vessels of a succenturiate lobe crossing the lower segment; or to a marginal insertion of the cord, in which condition aberrant vessels sometimes traverse the membranes before finally penetrating placental tissue. Rucker and Tureman (1945) state that the incidence of velamentous cord insertion has been given by various authors as between 0.4 and 0.9%. De Lee (1913) declares that there is a much higher incidence in multiple pregnancy. It is often associated with other placental abnormalities—namely, multilobed placentae, placenta succenturiata, and, in particular, placenta praevia. Although in most cases when bleeding from velamentous vessels occurs the vessels are praevia, five cases have been recorded in which vessels in the fundus have been ruptured.

The risk to the foetus is considerable, and foetal death *in utero* may occur from either asphyxia or exsanguination. Asphyxia is due to compression of the aberrant vessels in the lower segment by the presenting part. It is probably the greater of the two dangers to the foetus. Exsanguination may occur if the vessels are torn across.

Should a vasa praevia rupture, the child, even if born alive, may be severely anaemic and neonatal death may occur. The foetal loss in the 53 cases so far recorded has been 55%. This is very similar to the figure of 58% quoted by Graff (1921) in reviewing all cases up to that time. But in the 41 cases (67%) in which rupture of the vessels was known to have occurred the foetal loss was 73%. It must, however, be emphasized that vasa praevia is essentially a foetal complication. The only added hazards to the mother are those attendant upon interference by the accoucheur, such interference being undertaken solely on behalf of the foetus. Caesarean section is indicated in those cases discovered early in labour with the membranes intact, but the operation should only be considered before the vessels rupture, for once haemorrhage has occurred the prognosis for the infant is too bad to justify the increased risk to the mother. McNair (1921) and Vogt (1943) obtained living infants by abdominal delivery.

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Reviews

ANY QUESTIONS?

Any Questions? A Selection of Questions and Answers published in the *British Medical Journal*. (Second Series.) (Pp 195. 7s. 6d.) London: British Medical Association. 1952.

The second volume of *Any Questions?* contains an entertaining range of questions and answers. It includes such matters as piercing for ear-rings, the difference in frequency of micturition in the male and female, the survival of fleas, the alleged overheating properties of certain foods, and the radioactive hazards of watching television. The demand for advice on the treatment of common maladies such as petit mal, stomatitis, and urticaria suggests that treatment of these disorders is not always as successful as books and advertisements might suggest. There are now sections on psychological and marital problems. Patients discuss sexual difficulties with their doctors more freely than in the past, and it is perhaps the best way to treat them. When these disturbances persist in spite of simple explanation and reassurance, it does not look as if the expert can do much more for them in the present state of knowledge. Other questions hint at the great range of variation of mankind, both in physical make-up and in behaviour, and the need for caution before dubbing any unusual manifestation as pathological.

The volume of questions shows no sign of diminishing. Indeed, the problems of medical practice remind one of Schweitzer's simile of the tree which bears year after year the same fruit, and yet fruit which is each year new. It is not possible for the individual or the textbook to keep abreast of the whole advancing front of medicine, and for the busy practitioner, at any rate, a reference panel such as *Any Questions?* is a great boon. Moreover, our patients and friends expect us to be familiar with the oddest corners of knowledge, and this little book will certainly leave one in a better state of preparation for the fray. It is in the same format as the first volume, and is a pleasant book for the pocket. It should make a good Christmas present.

L. J. WITTS.

MODERN EPIDEMIOLOGY

The Control of Communicable Diseases. By Hugh Paul, M.D., D.P.H. With foreword by G. S. Wilson, M.D., F.R.C.P., D.P.H. (Pp. 526. £2 15s.) London: Harvey and Blythe. 1952.

In the past quarter century the medical officer of health has been so occupied with administrative matters concerning housing and hospitals that he has perhaps given too little attention to the epidemiology of disease, a knowledge of which is usually an essential precursor to the application of public health measures. Now that he has been relieved of some of these other responsibilities, and has available an efficient Public Health Laboratory Service, he may be expected to devote more time and thought to the study of the aetiological factors in the infectious and other diseases that constitute our modern plagues. Remarkable progress has been made in this field in recent years, but much of the information is scattered in various official reports and medical journals, and it is therefore not easily available to the busy medical officer who has not an up-to-date library at his elbow.

It is fitting that a most praiseworthy effort to bring the epidemiological data together should have come from the gifted pen of Dr. Hugh Paul, Medical Officer of Health of Smethwick. Those who know him and his missionary zeal will expect to find that the relevant information garnered from many sources will be presented in a vivid and often individualistic fashion, and they will not be disappointed. If there are inaccuracies here and there and points of view that immediately arouse the desire for argument, the wide reading and industry that have gone to the compilation of this volume excite the fullest admiration.

The household fevers—diphtheria, scarlet fever and acute rheumatism, measles, pertussis, and the pneumonias, etc., the food and drink infections (food-poisoning and food hygiene are very fully discussed), the neurotropic infections, the insect foes, and the "epidemic scourges" (over 60 pages are given to smallpox and vaccination, and over 40 pages to tuberculosis)—are all presented individually with accompanying vital statistics and graphs and many illustrative examples. The author pays unstinted tribute to the Public Health Laboratory Service as an important contributor to recent progress, quotes freely from the *Monthly Bulletin* which it inaugurated, and stresses the need in epidemiological work for co-operative effort between the bacteriologist and the public health administrator.

He also interprets epidemiology in its widest sense as meaning the study of disease among the people, and rightly includes epidemiological data about cancer, heart disease, diabetes, and accidents as examples of modern pestilences that have replaced the earlier scourges. As Dr. G. S. Wilson says in his foreword: "Our conception of epidemiology has got to be widened and every new method of study must be tried." The student of epidemiology will find this book a useful and stimulating starting point.

ROBERT CRUICKSHANK.

NEUROSURGERY

Essentials of Neurosurgery. By Leslie C. Oliver, F.R.C.S. (Pp. 198; 50 illustrations. £1 5s.) London: H. K. Lewis and Co. 1952.

This small book (of nearly 200 pages) is well produced and contains a number of good illustrations. By current standards the price is reasonable. The author has condensed much information in it and writes in a pleasant and readable style. He gives a good description of the general methods of operative technique, and emphasizes the importance of careful anaesthesia by including a chapter on the subject. In a book of this size, with its limited aim, the author must of necessity have had difficulty in allotting space to the various sections. For this reason the reviewer would have preferred that less had been given to the operations for the relief of tremor and to the details of cranioplasty. The internal brain herniations at the tentorial hiatus and the foramen magnum might then have been discussed more fully, for their importance deserves more detailed consideration. The diagnosis of brain abscess is condensed into a paragraph of 28 lines, and ought surely to have been larger; this could have been managed by pruning the chapter on trigeminal neuralgia. One surprising omission is of operations for the relief of mental disorders; leucotomy, orbital undercutting, and corticectomy merit inclusion certainly as much as operations for tremor. The author states that the neurosurgeon regards a fracture of the skull as "open" if the dura mater has been penetrated. This is not the usual definition, and it would be a pity if in neurosurgery an open fracture did not mean precisely what it does in fractures of other bones—namely, compound. The potential risks of infection are precisely the same. If there is dural penetration it should be an additional clear statement of fact.

These criticisms are offered in the hope that the next edition—which will surely be necessary, for the book should sell freely—will be even better balanced. It will prove of greater value to the neurosurgeon in training if references are given to the more important articles and monographs.

D. W. C. NORTHFIELD.

FOCAL SEPSIS AND MENTAL DISEASE

New Outlook on Mental Diseases. By F. A. Pickworth, M.B., B.Sc., B.Sc. (Pp. 296; illustrated. £3.) Bristol: John Wright and Sons. 1952.

This lavishly produced and illustrated book represents the results of a lifetime of research into the pathology of mental illness. The author has been particularly interested in the

influence of focal sepsis, especially in the nasal sinuses, on mental health. In his experience vascular changes, of a kind to be ascribed to the absorption of toxins, are important factors in the causation of mental disorder. He takes the view that pathological changes can always be found in the mental patient post mortem, and usually during life, and that the mental illness itself was caused by these changes. Thus he regards manic-depressive psychoses as being caused by multiple local ischaemic foci in the brain; post mortem he has found changes in the alimentary mucosa and in the mesenteric glands suggesting the absorption of toxic products, and, suggesting their effects, minute scars in brain, liver, and kidneys.

The focal-sepsis theory of mental pathology has been repeatedly criticized in the past, and the author is no doubt aware that his views run counter to the general consensus of opinion to-day, according to which other causes than those he mentions have to be ranked high in importance. One must regret, therefore, that he has not taken the opportunity of discussing the case against as well as for the views he holds. The psychiatric approach to problems of aetiology is much subject to changes of fashion, and it may well be that the climate of opinion of the future will be less hostile to his standpoint than it is now.

ELIOT SLATER.

MEASUREMENT AND PERSONALITY

The Scientific Study of Personality. By H. J. Eysenck, Ph.D. (Pp. 320; 30 illustrations. £1 10s.) London: Routledge and Kegan Paul. 1952.

It is not generally realized, even among scientists and doctors, that human personality can be and is being measured by modern experimental psychologists. Our understanding of one another in daily life, and the diagnoses of mental patients and neurotics by psychiatrists and psychoanalysts, are still a matter of art rather than science, of intuition rather than fact. Many conflicting theories of mental structure are put forward—for example, by Freudians and Jungians—and there is little or no proof of the effectiveness of the various methods of treatment adopted. Dr. Eysenck has collected the reported results of a large number of follow-up studies of patients and finds that there is actually no difference in the recovery rates of those treated by psycho-analysis, by other psychotherapeutic techniques, and those who merely go to hospital or who are advised by their own doctors without any formal treatment at all. He admits the difficulties of obtaining strictly comparable figures and the dangers of generalizing from this finding, but insists that objective, quantitative investigations of psychiatric problems are essential.

At the Maudsley Hospital Institute of Psychiatry he and his colleagues have gone a long way towards measuring, not every aspect of personality, but some of the main "dimensions," such as degrees of neuroticism, extraversion versus introversion, and psychotic tendencies. This is done by applying a long series of tests whose scoring is quite independent of any subjective judgment. The book gives a clear and well-illustrated account of such tests and of the results that have been reached with them—for example, studies of the personality changes following leucotomy operations, of the employability of mentally defective youths, of the selection of suitable student nurses, and of the importance of the hereditary factor in mental breakdown. Unfortunately it is highly technical, and much of it will not be understood without considerable psychological and statistical training. It is also somewhat unnecessarily polemical; it may irritate some of those who would benefit most from studying it. However, Dr. Eysenck has made a very strong case for strictly scientific investigations of personality, normal and abnormal, and he believes that advances can be made only through the collaboration and mutual understanding of psychiatrists and experimental psychologists.

P. E. VERNON.

EDUCATION BY FILMS

The Film in Education. By Andrew Buchanan, D.Litt., Ph.D., F.R.S.A. Introduction by J. A. Harrison, Ph.D. (Pp. 256; illustrated. £1 5s.) London: Phoenix House, Ltd. 1951.

This book represents an enthusiastic attempt to explain the wide use, both actual and potential, of films in education at all levels. This is obviously a tremendous task, and, although the extensive experience of the author permeates the text, frequent recourse to reported evidence results in a disjointed exposition. There can be little doubt that the net has been flung far too wide for this book to be useful for reference, but it is readable and contains innumerable allusions to books, meetings, and organizations dealing with film. There are, however, some inaccuracies and outdated facts.

The author likens the educational film to a visual textbook and stresses its particular use in presenting "background" or marginal subjects, a facet which has been largely overlooked in medicine. From this viewpoint the book itself is similarly styled, and it provides an interesting account of the intense and varied activities surrounding this medium at the present time.

The section on presentation or projection is perhaps out of place and should be the subject of another book, but it makes interesting reading. Remarking on the variable quality of projection in public cinemas, Dr. Buchanan points out that it is very revealing to view the same copy of a film in several theatres, and, further, that the average cinema-goer inevitably blames the film and its makers for any apparent defects. How much more forceful is this argument when it is applied to the improvised conditions of medical-classroom projection. If but a few of the principles outlined in this book were absorbed and observed, a better understanding and use of medical films might result.

PETER HANSELL.

SPANISH DICTIONARY

Spanish-English Chemical and Medical Dictionary. By Morris Goldberg. (Pp. 609. £7 9s.) New York and London: McGraw-Hill Publishing Company. 1952.

The historian F. H. Garrison said that the beautiful language of Spain is a social rather than a scientific medium. This statement is too sweeping, for both Spain and Spanish America have produced outstanding medical scientists. Moreover, Spanish is now second only to English as a medical language; in 1947 one-fifth of the journals indexed in the *Index Medicus* were in Spanish. We must not of course confuse quantity with quality, but the rapid modernization of South America suggests that Spanish will become increasingly desirable as a third foreign language for readers of French and German.

This handsome book is complementary to the author's *English-Spanish Chemical and Medical Dictionary*, published in 1947. It contains some 33,000 Spanish words, each defined in two or three lines, and encyclopaedic detail is avoided. The words are drawn from the wide field of the medical and allied sciences. The definitions were made after reference to many English and Spanish dictionaries, textbooks, and periodicals. A list of these sources guarantees the accurate reflection of current usage.

The dictionary was completed by the author's widow, Bessie L. Goldberg. Perhaps with the price in mind, she expresses the hope that with the earlier work it may be useful in reference libraries. These may well be the main buyers, for few individuals could afford so dear a book. Those who must forgo it can console themselves with the fact that a technical dictionary is a luxury. Technical terms are the least of a translator's problems; it is ordinary words and idioms that give most trouble, and help with these can be got from grammars and non-technical dictionaries, which are relatively cheap.

RAYMOND WHITEHEAD.

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THE PATIENT TELLS HIS STORY

Taking the patient's history is admittedly the most important part of a medical examination and the most difficult. The examiner is seeking to elicit the patient's complaints and then to elucidate them in terms of disordered bodily function. This sounds simple, but it is remarkable how many are the sources of error. The physician may be hurried, impatient, tired, inexperienced, prejudiced, unsympathetic, or negligent. The patient may be foolish, timid, aggressive, taciturn, loquacious, ignorant, or untruthful. How often does the common human frailty of examiner and examined combine to frustrate the best intentions of both? When the patient has little English or less hearing, and when he has been directed to the wrong specialist, further opportunities for mistakes arise.

The "Cornell Medical Index Health Questionnaire"[1] was designed to eliminate these faults of omission and commission. It is a four-paged quarto sheet on which are printed 195 questions which the patient is asked to answer by drawing a circle around "Yes" or "No." This written examination precedes the personal history-taking; the average patient takes 15 minutes to complete the form, while the physician can assess it in one to two minutes before he interviews the patient. The questions asked in the Cornell Medical Index (hereafter styled C.M.I.) are of four kinds and fall into 18 groups. The first kind concerns symptomatology ("Does your heart often race like mad?"); the second relates to past history ("As a child, did you have rheumatic fever, growing pains, or twitching of the limbs?"); the third inquires of family history ("Does stomach trouble run in your family?"); and the fourth is concerned with behaviour ("Do people often annoy and irritate you?"). More than half the questions make inquiry concerning the function of the various systems of the body, and most of the remainder relate to habit, to fatigue, and to disturbances of mood.

The C.M.I. has been used for four years in the New York Hospital. Physicians, by its use, can not only forecast practically all the diagnostic categories in which disease will later be discovered but they can usually name the actual diseases which are present. These results establish the accuracy and value of the data obtained by the C.M.I., but they could hardly be said to justify its use if it had not also been shown that it often disclosed evidence of disease which was later overlooked both in out-patient and in-patient investigation. No doubt these overlooked disorders were not always of considerable importance, but they were said sometimes to be of greater medical significance than those actually recognized. Naturally many of the unrecognized disorders were psychological, for the C.M.I. is notably comprehensive in the questions directed to the anxious, the fearful, the inadequate, and the depressed. These sufferers overflow into all clinics—whether medical or surgical—and that they should identify themselves so easily before reaching the designated consultant is certainly useful. Too much will not be expected of the C.M.I.: it cannot indicate a symptomless early cancer, and the psychological disorders which it clearly reveals are superficial rather than profound, the neuroses rather than the psychoses. Yet increased experience in its use will certainly enhance its value. For example, these investigators[2] conclude, from a statistical analysis, that there is presumptive evidence that the patient has a neurosis if he makes 30 or more "Yes" responses, if he answers three or more questions both "Yes" and "No," if he omits the answers to six or more questions, and if he adds three or more remarks or makes three or more changes in the questions. It will be remarked that there are other criteria which establish with more certainty and with greater humanism the diagnosis of a neurosis. This is so, but the C.M.I. is not intended to be the finished portrait: it is but the outline of a rough self-sketch.

If it must be admitted that no general physician sitting in an out-patient clinic addresses 50 questions to the patient's psyche, it will also be agreed that no specialist makes 100 forays beyond his own territory, and no psychiatrist probes the soma 100 times. The C.M.I. does all this with a minimal expenditure of the consultant's time. It tells the hospital doctor almost as much of the patient's complaints and the patient's personality as is known to a good family doctor. Since the family doctor has not always the time to convey this information fully in his letter of reference, the C.M.I. may well help to fill in the gaps. It is not clear from the published accounts whether these patients whose answers have been the subject of repeated analysis brought with them an introductory letter and, if so, to what extent it controverted or made redundant the patient's contribution.

A limited acquaintance with this form has shown that the English out-patient of average intelligence easily understands these questions, and although it was devised by New York physicians for New York patients it contains no words or phrases which require

[1] Brodman, K., Erdmann, A. J., jun., Lorge, I., and Wolff, H. G., *J. Amer. med. Ass.*, 1949, **140**, 530; 1951, **145**, 152; and 1952, **149**, 550.
[2] —— —— —— —— *J. clin. Psych.*, 1952, **8**, 119.

a close acquaintance with Hollywood conversation. It is yet another form to be filled in, but it raises no objection in the patient's mind, for it obviously advances his own interest, and it usefully occupies some part of his waiting-time, which cannot be less than a quarter of an hour even in these days of timed appointments. The task of the physician is made more easy because the patient's thought has been canalized by the questions, and the subsequent consultation proceeds smoothly from the basis of the positive replies. Whether the use of the C.M.I. in this country would also diminish the delay which must occur before wrongly directed patients are transferred to more appropriate departments and whether it would reduce the number of errors of omission—the missed diagnoses—can be determined only by a prolonged investigation. Such an investigation would be worth while.

HOSPITAL COST ACCOUNTING

One of the common criticisms of the National Health Service is that the hospitals are running away with all the money, and there has been a fairly widespread suspicion that, released from the parsimony of earlier days, they have been extravagantly run. With the bill for wages, equipment, and food still rising the Minister of Health is going to find it difficult to reduce hospital expenditure, and it is essential for his purposes that the present inadequate accounting arrangements in hospitals should be brought up to date. When the Service began the Ministry was forced to introduce a simple system so that the diverse methods used by the many former authorities might be co-ordinated and a uniform set of accounts produced for the whole Service. In order to remedy the most serious deficiencies in the original system a subcommittee was appointed by the treasurers of regional hospital boards to examine the position. In 1950 this subcommittee made an interim report containing recommendations designed to make improvements without adding to the technical difficulties of the labour entailed. These recommendations were accepted by the Ministry, and led to the production of the returns which were summarized in a publication of the Ministry earlier this year.[1] This document, though much criticized, did provide useful information, and the accountancy system on which it was based has been continued to date. Meanwhile the subcommittee set up by the treasurers of regional hospital boards continued its deliberations, and in 1950, at the request of the Minister—acting on a recommendation of the Central Health Services Council—the Nuffield Provincial Hospitals Trust and the King Edward's Hospital Fund for London entered the field, the treasurers of the regional hospital boards bringing to bear their expert knowledge as officers actively concerned with the problems of the Service, the two charitable organizations introducing outside experts to collaborate with hospital staffs in conducting experiments in cost accounting. Last July the treasurers published a second report,[2] and the Trust[3] and the Fund[4] have now produced reports on the experiments which they have carried out.

Modern systems of accounts must serve two purposes and it is important to be clear from the outset what these purposes are. The first is to show the financial results of work done over a period of time. This is fundamental. The second is to build up these results in such a way that, as the Trust report says, "each responsible member of the staff is made aware of expenditure incurred by him for his department, and of variations in that expenditure which are within his control." In other words, accounts must not only show financial results, they must also serve as an aid to management. Each of the three reports brings out these essential points, and all three deserve serious study not only by those concerned with finance and accounting but by all interested in hospitals. In pursuing and analysing hospital expenditure the reports portray the many and diverse activities which together constitute a modern hospital and demonstrate how complex an organization it is. As is stated in the report of the Nuffield Trust, "there are a few factories which have the inherent complications of a hospital with its many, almost unrelated, departments." In view of the different methods of approach to the subject it is perhaps surprising to find so many points of similarity between the three reports, and the Trust and the Fund have published a joint statement which sets out agreed recommendations. The principal recommendation is, in fact, common to all three reports: this is the desirability of introducing a costing system which will relate expenditure to the departments of the hospital in which it is spent and will provide comparative units of cost. This unanimous conclusion must override the differences between the reports and must influence the Ministry, since the problem is thereby reduced to one of method rather than end-result. Perhaps the most obvious difference in the reports is one of style. This, though not important in itself, does reflect a divergence of outlook, particularly between the treasurers of the regional hospital boards and the two organizations. The treasurers' document is an accounting survey of the problem, and in its essence is a working technician's job from which a costing system could readily be produced. Having examined the problem in the light of

[1] *Hospital Costing Returns*, H.M.S.O., London.
[2] *Hospital Cost Accounting*, 1952.
[3] *Report of an Experiment in Hospital Costing*, 1952, Oxford.
[4] *Report on Costing Investigation for the Ministry of Health*, 1952, London.

their experience, the treasurers state that "the immediate purpose should be to separate the cost of treating out-patients from the cost of treating in-patients, and the first step must necessarily be to ascertain the cost of specialist departments in which both in- and out-patients are treated." They do not, however, at this stage in costing development advocate the further analysis of in-patient expenditure between wards, but think that this first step in arriving at the "hard core" of hospital expenditure may by itself provide a useful basis for comparisons. This course is recommended, despite limitations which are acknowledged, to avoid over-elaboration of the system. Throughout this report there is a cautionary note against costing for costing's sake.

The documents published by the Nuffield Trust and the King Edward's Fund record the findings of experimental work carried out in certain hospitals, but neither is quite so down to earth as the regional treasurers' report. Both range over a wide field of finance and accountancy and seem much more certain of the advantages—particularly in the direction of budgetary and financial control—to be gained from departmental costing than are the treasurers. They also discount the attendant cost and technical difficulties of modern costing methods much more heavily. Apart from these generalizations, the report of the Nuffield Trust differs from the reports of both the regional treasurers and the King Edward's Fund in that it advocates as part of the basic system the departmental allocation of "direct" charges only. The other two reports go further and provide for the allocation of "indirect" charges to departments and to in-patients and out-patients accounts, so that the total cost of these may be ascertained as part of the basic procedure. This course seems preferable, particularly as what are direct charges in one hospital may be indirect charges in another, and without this further allocation comparison between hospitals may be invalidated. The Fund, however, while recommending the introduction of its system in progressive stages, prescribes an ultimate stage in which the detailed costs of individual wards are required: this goes beyond the requirements of the Trust, which groups wards into medical specialties, and the regional treasurers, whose "hard core" theme has already been mentioned. The reports of the Nuffield Trust and of the regional treasurers lay greater stress on the need for improved statistical data than does that of the King's Fund. The treasurers "find the lack of suitable statistical information a serious hindrance to the production of reliable unit costs," and they emphasize that "the efficacy of comparative costing depends ultimately on the degree to which the cost units adequately describe the quantum of work done or service rendered." In this field the Trust has carried out invaluable work in collaboration with specialists and technicians engaged in hospital departments. Their report contains a section devoted to this aspect of cost accounting and their findings may fill the gap of which the treasurers complain.

While the main conclusion—that is, the desirability of departmental costing—is common to all three reports, there is a fundamental difference between the regional treasurers and the other reports on the accounting approach to this common result. The accounting system now used in the hospital service is based on a "subjective" analysis of expenditure within each hospital. That is, it shows *on what* the money is spent—salaries, wages, provisions, etc.—in detail, but only shows *where* it is spent in total for each individual hospital. The treasurers wish to continue the subjective approach but to refine it further so that the "where" or objective aspect is set out to give the cost of individual services and departments within each hospital. In short the treasurers wish to know on what the money is spent first and where it is spent second, or in terms of accounting jargon their approach is subjective/objective. Opposed to this, both the Nuffield Trust and the King Edward's Fund in their joint statement recommend that the existing subjective accounting system be discontinued, and they attach great advantages, particularly in the reduction of labour and cost, to this recommendation. Their claims would be more readily appreciated if in their reports either the Trust or the Fund did in fact discard the subjective in favour of a purely departmental or objective analysis. Neither do in fact adopt this course, and the change they advocate is simply one of accounting approach. It seems therefore that, since all three reports require expenditure to be analysed two ways, the amount of work involved and the results would be about the same.

As the Minister now has three separate reports on a highly complex subject, he is perhaps fortunate in that the main difference is book-keeping rather than principle. His difficulties will rather lie in the fact that additional staff will undoubtedly be needed to produce the further analysis required. The Ministry is at present attempting to reduce hospital staffs, and review teams have been engaged in examining administrative staffing needs. Since finance as such has not been represented on these teams, the staff for so technical a matter as cost accounting is unlikely to have been considered. Before embarking on drastic amendments of the present accounting arrangements or on any large-scale experiments in departmental costing the Ministry will doubtless give due weight to the simple fact that an accountancy or costing system can measure cost only in terms of

work done. It can never by itself disclose whether high costs are due to inefficiency or are an indication of better quality. What it can do is to provide information that will help the person responsible for any service to judge whether he is providing that service at the lowest possible cost consonant with its efficient and humanitarian discharge.

VAGINAL DISCHARGE

Vaginal discharge is a common complaint, so common that there is perhaps a tendency to overlook its importance to the patient. An excess of normal moisture, distinguished by the absence of pus cells and often occurring premenstrually and in pregnancy, is best treated by reassurance alone. But a simple infective discharge, or a compound discharge including blood, urine, or faeces, requires treatment. And, as Dr. Ian Donald emphasizes in a paper at page 1223 of this issue, correct treatment demands clear identification of the cause. A woman with a compound discharge is best referred to hospital, while the treatment of simple leucorrhoea is within the province of the general practitioner, unless there is very acute inflammation or the discharge defies treatment or recurs repeatedly. In the adult trichomonal vaginitis is the commonest cause of discharge, but, as Donald points out, we still know too little about the life history of the *Trichomonas vaginalis*, the modes of infection, and in particular the factor or factors which can change a symptomless carrier state into an acute infection. Trichomonal vaginitis is usually easily diagnosed by the characteristic creamy greenish-tinged bubbly discharge. Besides being the commonest cause of pruritus vulvae, it may be associated with slight menorrhagia or with low abdominal pain. It usually responds to simple measures such as a daily douche with 5-volume strength hydrogen peroxide and the nightly insertion of a trichomonicidal pessary; the course of treatment must be prolonged over at least five weeks, and the pessaries, but not the douches, must be continued during menstruation in that time. Coitus is probably best forbidden during treatment. The medicament of choice may occasionally aggravate the inflammation by causing a chemical vaginitis, and because of this, and because the trichomonas is apt to become resistant to any one drug, it is wise to change the type of pessary every 10 or 14 days.

The other common form of vaginitis, that due to monilia (usually *Candida albicans*), causes a scantier curdy discharge, and though itching is often intense it is, as with trichomonal infection, not invariably present. The appearance of the vagina is similar to that of the mouth in buccal thrush—reddened but spotted with white clots. Monilial vaginitis is commoner in pregnancy and in the presence of glycosuria, and therefore diabetes must always be looked for. The condition may prove difficult to cure during pregnancy, but it can at least be checked by local painting with 1% gentian violet and the use of fungicidal pessaries. Donald found achlorhydria in two women with resistant infection and intense pruritus, and obtained a dramatic response to the administration of dilute hydrochloric acid. But it is likely that the pruritus was due, as it often is, to the achlorhydria and that the monilia was coincidental.

Donald recommends that in gynaecological out-patient departments cases of vaginal discharge, other than those due to venereal diseases or causes amenable to surgery, should be segregated into a special clinic. This is certainly advantageous to the medical staff, and it may result in more efficient local treatment for the patient. But the scheme is not free from drawbacks, for many of these women are already acutely self-conscious about their discharge; and a special clinic, with its tempting opportunities for conversation with patients whose infections are persistent or recurrent, may only serve to put further out of perspective in the woman's mind what is an uncomfortable rather than a serious disorder.

YOUNG CHILDREN IN HOSPITAL

A film[1] shown to the Section of Paediatrics of the Royal Society of Medicine on November 28 draws attention to the possible effects on a young child of admission to hospital. It will probably be agreed that the 2-year-old girl depicted was unhappy and that possibly her unhappiness might have been prevented. The film is part of a wider investigation under the general direction of Dr. John Bowlby into the effects of the separation of young children from their parents, and it shows, by strict time sampling, some of the experiences of a child selected at random from the waiting-list for a relatively minor operation. She came from a good home and was free from psychological problems; but, though the standard of care in the hospital was high, she undoubtedly fretted. Audiences generally agree that this film is authentic, and it poses the questions: Are such experiences permanently damaging to children? Do they occur commonly enough to be part of the recognized effects of admission to hospital? Is further evidence necessary before we are justified in attempting to prevent these things happening?

Jackson and his colleagues[2] have reported that almost all of a group of 105 children, ranging from 3 to 8 years, admitted for tonsillectomy showed some immediate reaction on return home, usually of a clinging and babyish character, and that 17 of these children retained this less acceptable new behaviour for more than three months. The clinical impression is that children who fret after admission usually settle down after a few days, and, although many of these children regain their spontaneity, perhaps more become docile, even resigned. Others react aggressively and remain excitable and "naughty." These phenomena are similar to those met with in the early stages of permanent separation of children from their parents, and the important unsolved question is: How prolonged and how intense can these experiences be without causing permanent damage? Evidence about

1 "A Two-year-old Goes to Hospital," by James Robertson.
2 Jackson, K. *et al. J. Amer. med. Ass.*, 1952, 149, 1536.
3 Bowlby, J. *Maternal Care and Mental Health*. World Health Organization Monograph Series, No. 2. Geneva, 1951.

permanent or long separation has been assembled by Bowlby in a report to the World Health Organization.[3] In the first year of life children separated for long periods from their mothers may suffer permanent damage of their capacity for entering into loving relationships with other people. In the second and third years separation may be followed by gross retardation in social development, persistence of primitive codes of behaviour, lack of capacity for intimate friendship, and sometimes the growth of a deep underlying hostility. Morbidity statistics of institutions for children have shown how the damage can be somatic as well as psychological.

To continue to neglect these matters is a grave risk to children. It is sometimes argued that children need to suffer some unhappiness if they are to grow up mature adults, but this is a moral function of the parents and remote from, and even inimical to, the healing function of the hospital. Jackson suggests, with common sense, that if all phases of the hospital experience are adapted to the child's ability to adjust, and are carried out with friendliness and consideration, mental injury would be greatly decreased. The part the mother should play, and how often parents should visit, may be more controversial subjects. But one principle is perfectly clear: hospitals must remember that children belong to their families and will return to them shortly. Measures, such as the mother helping in nursing, which strengthen family ties and improve the mother's confidence are in the child's proper interest. Procedures with a contrary effect, particularly those requiring a difficult adjustment by the child—perhaps by docility and "good" behaviour rather than spontaneity—are against the main stream of the child's life and an extra burden on his resources. The safety margin before permanent damage is done is still unknown and the taking of risks absolutely unjustified. Much further research is required into the child's reactions and needs when going into hospital.[3] Such research can no more afford to depend on a mere clinical impression than can the mass protection of children against tuberculosis. It is a matter for scientific planning and conduct by people skilled in the assessment of the emotional development and relationships of young children.

PUERPERAL MENTAL ILLNESS

The study of the mental illnesses associated with the puerperium described by Dr. R. E. Hemphill at p. 1232 will interest medical men working in general medicine, public health, obstetrics, and psychiatry. His comprehensive survey in the Bristol area was extended over more than 10 years, and provides a fair estimate of the incidence of the more serious forms of mental illness accompanying childbirth. The fact that it was as high as 1.4% shows that these mental complications are to be taken seriously, and their possible occurrence should be constantly borne in mind. The question naturally arises to what extent they are preventable.

The report shows that there is certainly scope for improvement here. Nearly 30% of the mental illnesses observed in maternity hospitals, and nearly 20% of those so severe that admission to a mental hospital was called for, were confusional states or toxic delirium. At one time most puerperal psychoses were of this type, but their frequency has progressively diminished with improvement in antenatal and obstetric care. No doubt still more can be done in this way. A point to be noted is that it was this group of conditions, apart from one suicide, which provided all the deaths observed in the series. Those patients who did not die all recovered; but removal from one hospital to another is not an action taken without risk to the patient. So far as possible these patients should be treated in the lying-in hospital, if necessary in a small special ward. Once the diagnosis is clear, that it is an organic and not a schizophrenic or affective psychosis, treatment is best conducted by doctors and nurses trained in obstetrics and general medicine. Psychiatric advice is necessary, but removal to a psychiatric hospital should be rare.

For treatment to be effective, early recognition is important. Apart from the usual signs of toxaemia or impaired physical health, the psychiatric signs which should engage attention are disturbance of sleep, restlessness, especially at night, and clouding of consciousness. When the patient ceases to be alert and interested in her baby and in the visits of her husband, when she loses count of time and makes mistakes in the hour or day, and still more when she begins to talk in a rambling way and to make strange remarks, or falsely recognizes other patients as acquaintances and ceases to be clear where she is, then a confusional state is present which may go on to delirium and even death.

One of the interesting aetiological features which the report brings out is the mental robustness of nearly all women when the time comes to bear their child. Minor emotional upsets are fairly common, but the ordinary psychogenic causes of mental disturbance appear to recede into the background and to exercise little influence. The patients who develop affective or schizophrenic psychoses are probably predisposed to do so, and their breakdown may be attributed to endocrine rather than to psychological causes.

Two findings are of special interest: first, the occurrence of depressive states which clinically resemble the depressions of later life and of the menopause and like them tend to be of protracted duration; and, secondly, the almost uniformly poor prognosis of the schizophrenic patients. Some previous workers have noticed that puerperal schizophrenia has a less favourable prognosis than schizophrenia arising under other circumstances, but the malignant course taken by the nineteen patients observed by Dr. Hemphill comes as a surprise. It is possible that his diagnostic criteria were unusually strict, and that other clinicians would have included among the schizophrenics some patients who, in this series, were diagnosed as suffering from different conditions and who eventually recovered. Nevertheless the finding is suggestive, and it would be a desirable addition to our knowledge if it could be confirmed. If puerperal schizophrenia runs a different course from other forms of schizophrenia, then it must be regarded as, to some extent at least, a condition *sui generis*. Further investigation into its pathogenesis would then be important.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

ACUTE OSTEOMYELITIS AND SEPTIC ARTHRITIS

BY

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Although it is true that the outlook in acute osteomyelitis and septic arthritis has been almost miraculously changed by the use of penicillin, successful treatment still requires early diagnosis, first-class medical and nursing care under continuous supervision, and adequate local and general supportive measures. In this article the discussion is limited to blood-borne pyogenic infections, and in particular to the bone and joint disease of children usually due to infection by *Staphylococcus aureus*.

Osteomyelitis is a general systemic infection with focal pyaemic lesions in the bone, skin, and other soft tissues. The importance of the disease is due to the severity of the lesion in bone occasioned by the anatomical and physical peculiarities of its structure and blood supply. As in other general infections, the invasion of the body by pathogenic organisms, and their circulation in the blood stream, is not the full explanation of the development of the disease. Injury has often been invoked as a factor in osteomyelitis because it affects boys predominantly and the bones of the lower extremity more frequently. The susceptibility to injury, though probably commoner in boys, is a feature of childhood. The stresses borne by the infantile skeleton are greatly out of proportion to the weight of the child: the vulnerability of bone is particularly found at the metaphyses. If to injury is added the presence of organisms circulating in the blood stream there must also be a general constitutional defect causing a temporary breakdown of antibody defences.

Osteomyelitis used to be regarded as a disease peculiar, more or less, to the poorer strata of society in which hygiene was defective. This is not the experience of an orthopaedic hospital away from the big cities but dealing with both urban and rural populations. In a random selection of 10 cases admitted to the Princess Elizabeth Orthopaedic Hospital the number of children in the private residential school group was equal to that from local education authority schools. A seasonal incidence is sometimes to be noticed, particularly in December and the early months of the year.

The Clinical Picture

The fact that a patient may have a single focus of bone or joint infection should not cause the practitioner to overlook the general constitutional disease, which, though never trivial, can be so serious as to mask local signs and to mimic other important general diseases such as acute rheumatism, poliomyelitis, and meningitis. The element of mimicry is apt to cause confusion not only in such general manifestations but even in the local lesions, in which symptoms may be referred far afield from the actual focus. As an illustration I recall a case which though seen very many years ago has left a very vivid memory. A desperately ill child of about 10 was admitted to a medical ward with right-sided abdominal pain; the physician diagnosed appendicitis, but his surgical colleague regarded the case as one of pneumonia. The disease was of fulminating type, and the child died. The necropsy was dramatic: the pathologist, having ascertained that neither diagnosis was correct, then proceeded with his investigations. Eventually the heart muscle was incised to reveal multiple small abscesses which, as he said, "were almost certainly staphylococcal and therefore related to haematogenous osteomyelitis"; he then exposed the shaft of the right femur and proved himself right.

It should be recognized that there is great variety in the clinical pictures which osteomyelitis presents. Even with a single focus the manifestations may range from the relatively benign with few symptoms and signs to the really fulminating in which the child's distress is serious and his toxic state obvious. Pain may be so intense as to cause an inhibitory state of pseudo-paralytic type. The toxic condition may lead to coma, suggesting meningitis, but when less severe it can cause an apparent stupidity which may seem like mental deficiency. The following cases illustrate some of the difficulties.

Cases

A 12-year-old girl was admitted to an isolation hospital as a case of cerebrospinal meningitis. A lumbar puncture produced a normal fluid under increased pressure. She was restless, delirious, and semi-conscious, and later became unconscious. Penicillin was given, 2,500,000 units being spread over eight days. After 2,000,000 units had been given she became afebrile. Three days after the cessation of penicillin the temperature rose again and she was found to have a swelling over the lower third of the left thigh, extending into the popliteal fossa. She was then admitted to an orthopaedic hospital where a large subperiosteal abscess was opened, and further penicillin was given for three weeks, the child making an uninterrupted recovery. The early radiographic evidence of metaphysial infection completely resolved.

A boy aged 10 had not been well for three weeks following a superficial abrasion of the left ankle, with inguinal adenitis. He was treated with sulphonamides, but after a week began to have pain and swelling of the left knee. This was aspirated and penicillin was injected into the joint. He was also given 15,000 units of penicillin three-hourly. A high temperature continued and he became toxic. The day before admission to hospital a swelling appeared in the opposite knee. On admission he had a temperature of 102° F. (38.9° C.), a rapid pulse, and an enlarged heart. Both knees were swollen and he was thought to be suffering from rheumatic fever. Aspiration of the right knee produced a clear sterile fluid. His blood showed a leucocytosis of 20,000 (91% neutrophils). For three days sulphonamides were given and both legs were supported on Thomas splints. His temperature showed signs of subsiding, but on the third day there was pericardial friction and his temperature again rose. The next day both femora were exposed through postero-lateral incisions. There were large subperiosteal abscesses and pus under tension in both medullary cavities. After this the general condition rapidly subsided to normal. The wounds healed in less than a month and the two femora returned practically to normal radiologically in six months.

A girl aged 15 was admitted to an isolation hospital a week after some rough play with two boys and a fall off a bicycle, which was followed by pain in her right leg and a limp which did not prevent her from going to work. A day or two later her leg became weak. Three days before admission a general practitioner found no bruising or swelling of the leg and that the hip could be moved freely but with discomfort. The day before admission she lost her voice. On admission she looked very ill, was semi-delirious, had diminution of reflexes in the right lower extremity, incontinence of urine, and a normal cerebrospinal fluid. There was a foul vaginal discharge. At first she was thought to be suffering from acute anterior poliomyelitis, but the pyaemic

nature of her disease was soon recognized. The general manifestations were brought under control with massive doses of penicillin, but the response was slow because at first the full severity of the local disease was not recognized and because no surgical treatment was thought to be necessary. It is impossible in a few words adequately to convey the picture which this case presented: the gross involvement of the whole shaft of the right femur in an osteomyelitic process, massive sequestration, encrustation with new bone throughout the periosteal covering, and septic arthritis of the hip-joint, the only treatment for which was parenteral penicillin and immobilization of the hip and limb in plaster-of-Paris. It was some months before the patient was transferred to an orthopaedic unit.

These three cases illustrate difficulties in diagnosis. It is essential that osteomyelitis should be considered in the differential diagnosis in any child with an acute generalized infection, particularly if there are one or more of the following signs: pain and tenderness in a limb, particularly in relation to the long bones or in the neighbourhood of joints; swelling of or near joints; weakness and even paralysis of a limb; or muscle spasm or loss of movement in one or more joints. It should be remembered that symptoms may be referred far from the site of the disease, and that the general toxic state of the patient may by mimicry mask its real nature.

Anatomical Considerations

Recognition of the structural peculiarities of growing bone will explain much of the special morbid anatomy of osteomyelitis. To explain this a familiar diagram (Fig. 1) is used to show the relationship of epiphysis with epiphysial cartilage and the diaphysis with its metaphysial area of new-formed bone arising from the epiphysial cartilage. It illustrates the periosteum (a wavy line) and its attachment to the epiphysial disk, its continuity with the tendinous and ligamentous attachments of bone, and the relation of all these structures to synovial reflections and the neighbouring joint cavity. The importance of the relationships is well seen at the hip-joint (Fig. 2), which so commonly is involved secondarily to osteomyelitic lesions of the upper end of the femur.

FIG. 1.—Diagrammatic representation of femoral metaphyses, their blood supply, and their relation to joint cavities. S=Synovial cavity. FA=Foveolar artery. RA=Retinacular arteries. NA=nutrient artery. GA=Geniculate arteries. M=Metaphysis. D=Diaphysial portion of caput femoralis (intra-articular).

Equally important to these main structural arrangements is the distribution of the vascular supply, which is from three sources: (1) the diaphysial nutrient vessel, which enters near the centre of the shaft and divides into two branches which pass upwards and downwards to the ends of the medullary cavity and supply its internal structure, and also help to do so for the metaphyses; (2) the surface supply of the cortex, through blood vessels within the periosteum; and (3) the arterial circle of Hunter, which surrounds the ends of the bones and supplies branches to the epiphysis and metaphysis through the neighbouring periosteum. At the upper end of the femur there is a further vascular supply to the epiphysis through the ligamentum teres. Anastomosis of the smaller branches of all these arteries takes place, but if there is occlusion of major radicles revascularization of the area affected is difficult and necrosis tends to occur.

In the past there has been controversy concerning the primary site of infection. There is little doubt that infection may reach the bone through any of the normal vascular channels, but British experience provides overwhelming support for stating that the metaphysial focus is the commonest.

The arrival of organisms in the vascular channels of the metaphysis may be by small emboli or by the infection of a pre-existing haematoma. Whatever the nature of the initial focus, there are two sequelae of widely destructive nature: (1) the production of an inflammatory exudate, which causes a rise of intra-osseous pressure and obstruction to the venous return; and (2) thrombosis of the veins completes the vascular interruption, and bone necrosis is its result. The extent of necrosis is dependent upon the severity of intra-osseous pressure and upon the extent to which the large blood vessels are obstructed. The natural relief of intra-osseous pressure occurs as the necrosis or bone absorption in the neighbourhood of the thinner cortex of the metaphysis permits pus to escape under the periosteum. This may occur early to such an extent as to limit considerably the diaphysial necrosis. In this event pus tracks along the shaft of the bone under its periosteum, lifting this away from the bone itself, and thus involves subsequent interference with the vascular supply of the superficial parts of the cortex, which may themselves then suffer necrosis and superficial flaky sequestration. These last-mentioned changes may occur by themselves owing to primary involvement of periosteal blood vessels without medullary or metaphysial involvement.

The essential changes, then, are inflammatory exudation, rise of intra-osseous pressure, vascular interruption, and thrombosis. Upon the extent to which the blood vessels are obstructed and the tissues devitalized is dependent the failure or imperfections of antibiotic treatment. It should further be noted that in the early stages, when correct treatment is most important, radiographic examination is of no help. In fact there is *no* way of knowing precisely the extent or intensity of the vascular occlusion. These circumstances must influence judgment regarding the need for and type of surgical intervention.

Treatment

The aim should be to control the general constitutional disorder and to prevent the mechanical effects of vascular interruption and inflammatory exudation. This can only be achieved in the first few days of the disease by adequate maintenance of the penicillin level in the blood. The absorption of the toxic products into the general circulation is controlled by precise application of physiological rest. These two measures must be applied with the greatest efficiency from the onset. In those cases in which, after 48 hours, severe pain and tenderness continue and the temperature is not showing signs of falling, decompression of the affected bone must be carried out. The sensitivity to penicillin of the organism concerned should be checked, if possible by aspiration or by incising and opening the bone. After five days without satisfactory response to conservative measures surgery is essential.

FIG. 2.—Diagram showing the influence of spreading zones of intra-osseous pressure arising from a central abscess (black circle). Arrows indicate penetration of metaphysial cortex into synovial cavity or diaphysial spread. Compared with Fig. 1 it will be noted that vascular obstruction by such an abscess may cause epiphysial necrosis (indicated in black).

Physiological Rest

By this is meant giving rest to a part of the body in the position most favourable for the biological processes of growth and repair, while safeguarding functional restoration. Its purpose is to promote healing by reducing the local physiological demands of the limb, by avoiding the aggravation of pathological processes and the spread of infection by movement, and by bringing to bear upon the lesion the whole general metabolic resources of the patient. The rest is graduated according to the activity of the disease and should readily permit progressive activity as infection becomes controlled. During the phase of acute inflammation perfect immobilization is required. For each limb and every joint there is a physiological position which is optimal for the average needs of the limb. This position is not a fixed one but varies, and is usually near the middle of the normal range of movement of the joint concerned. In the lower extremity joints are generally rested in positions rather more extended than the previous statement suggests. A list of suitable joint postures is given in the Table.

Optimal Positions for Physiological Control

Joint	Position	Joint	Position
Shoulder	Abduction 45°; flexion 30°; external rotation 15°	Hip	No abduction or adduction; rotation nil; flexion 20°
Elbow ..	Extended to about 100°	Knee	Flexion 15°
Forearm	Mid-prone-supine position	Ankle	Right angle or, in woman, a degree or so below
Wrist ..	Extension 15–20°	Tarsal	Neutral as to inversion or eversion
Digits ..	All joints flexed about 25°. Thumb abducted and opposed moderately	Toes	Maintain flexion of metatarsophalangeal joints and extension of interphalangeal joints
Spine ..	Normal curves maintained		

It is important to avoid makeshift appliances which do not fit comfortably or maintain perfectly the position required. For the lower extremity the Thomas splint cannot be improved upon. There is no contraindication to the use of plaster-of-Paris splints, provided they are split to enable adequate observation of the limb. In many cases these may be preferable because of the better immobilization and comfort which they provide.

Antibiotic Treatment

The importance of maintaining an adequate blood concentration of the appropriate antibiotic when indicated has been repeatedly stressed in this series of articles. If the response to antibiotic treatment is not adequate, either the organism is insensitive or surgery is needed. The move towards more exotic and more expensive antibiotic drugs should not be allowed to take the place of common-sense surgical judgment. In all cases in which the clinical signs (including the temperature chart and the white-blood-cell count) indicate an abscess or bone necrosis the bone should be opened as soon as possible.

The continued use of antibiotics over a long period because of the persistence of local activity and because of failure to operate at the right time may produce unresolved bone lesions of strange type which can even mimic radiologically such conditions as malignant bone tumours. Furthermore, these lesions, especially if in the central diaphysis, are vulnerable to stress and may cause pathological fractures.

Associated Lesions

Treatment of Suppurative Arthritis.—If a joint is involved secondarily to a neighbouring osteomyelitic lesion the proper surgical treatment for the latter is of first importance. Spread of infection from a neighbouring bone is the commonest way in which joints are infected in childhood. Aspiration of the joint in all types of septic arthritis is an important diagnostic procedure. Furthermore, aspiration readily permits the direct instillation of antibiotics; a method of treatment which is of special value. Penicillin, having a large molecule, is not readily removed from joints into the blood stream, and a high concentration remains long after the injection has been given. During the early period of treatment, however, it is necessary to maintain a high concentration in the blood in order to deal with the general systemic aspect of the infective lesion. The unsatisfactory nature of this treatment in the presence of a neighbouring bone focus should be stressed. If the purulent effusion is clearly associated with a local bone focus and is not responding to antibiotic therapy, the need for surgery is particularly indicated for the bone itself.

Osteomyelitis in the Newborn.—During the first few weeks of life osteomyelitis, generally of the femur, may occur secondarily to umbilical infection. Compared with osteomyelitis in older children, it is relatively more often due to streptococcal infection. At a few weeks of age a painful swelling of the femur, or of any other bone for that matter, raises an interesting point in diagnosis, but while infantile hyperostosis corticalis is a rarity, the practitioner would do well to keep in mind the possibility of scurvy and syphilitic epiphysitis. The *x*-ray picture of a well-established case of scurvy is strikingly similar to that of osteomyelitis affecting the whole shaft of a long bone.

Other Sequelae of Osteomyelitis.—Most of the sequelae are beyond the scope of this paper because they come under the heading of chronic osteomyelitis. These include sequestration, sinus formation, Brodie's abscess, pathological fractures, and amyloid disease, all of which should, under modern conditions, become rarities. Cases from the pre-penicillin era, however, still appear and occasionally, alas, even now cases occur as the result of imperfect early treatment. Septic arthritis has briefly been mentioned. It is at the hip-joint that special complications may arise—namely, pathological dislocation and separation, with or without necrosis, of the upper femoral epiphysis due to massive infection of the metaphysis. Necrosis, as elsewhere, is dependent upon the extent to which the blood supply has been obliterated. When apparent, these complications become major surgical emergencies.

Next Refresher Course Article.—"The Backward Child," by Dr. B. H. Kirman.

Refresher Course Book.—The first 55 articles of this series (fully revised) are available as a book, price 25s. including postage, from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

IMPRESSIONS OF A VISIT TO KOREA AND JAPAN

BY

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Late Director-General, Army Medical Services

In January and February, 1952, I visited the British Commonwealth Forces in Japan and Korea by courtesy of the Commanding General, Far Eastern Command, and the General Officer Commanding, British Commonwealth Forces. Brigadier-General William E. Shambora, Chief Surgeon of Far Eastern Command, welcomed me and gave me every facility to visit all medical installations.

The first visit was made to the U.S. Army equivalent of a British Army base pathology laboratory, which was organized in seven sections, dealing with such subjects as bacteriology, epidemiology, blood transfusion, etc., and had a total staff of about 300. Here the problems being dealt with included the cause of epidemic haemorrhagic fever, research on infective hepatitis, and measures to render water safe from bilharzia.

Epidemic haemorrhagic fever was reported as being limited to a circumscribed forward area in Korea, and the greatest incidence appeared in the autumn months. I was told that the disease could at times be diagnosed from the appearance of the suffused conjunctivae. The mortality had been between 8% and 12%, and treatment was symptomatic, as no specific drug had been discovered that was able to affect the course of the disease. This may not be surprising, as the cause is so far unknown. I thought the use of the term "epidemic" was unfortunate, as this might lead uninformed opinion to believe that the disease was sweeping through the Forces. In fact, nothing in the nature of an epidemic had occurred, and the disease might be likened to the incidence of scrub typhus in Malaya and Burma. I saw only three cases of this disease in 29 General Hospital, the Commonwealth hospital at Kure, in Southern Japan.

Military Hospitals in Japan

29 General Hospital occupies the Japanese naval hospital, and has nearly 1,000 beds, staffed by British, Australian, and Canadian R.A.M.C., R.A.D.C., and nursing services, under an R.A.M.C. colonel. The hospital was a busy one, as all sick and wounded from our Forces in Korea were evacuated to it, either by plane or by ship. A full complement of specialists was present. As active operations were largely in abeyance during the truce talks in Korea, the medical cases under treatment were naturally much greater in number than the surgical. Surgery was mainly confined to accidental injuries and to burns caused by the petrol heaters which were much in use during the winter. In burns of the second degree the exposure treatment advocated by Wallace was followed with success in both the Commonwealth and the American hospitals, and early excision and skin grafts were carried out in burns of the third degree. Among medical cases infective hepatitis and V.D. were major causes of sickness.

Dried plasma for transfusion has not been popular with the U.S. Medical Corps because of the incidence of jaundice following its use, and the transfusion problem has been solved by the extensive employment of whole blood through blood banks. Donors were bled in Tokyo, but this supply was augmented by blood flown daily from the United States to as far forward as the surgical hospitals in Korea. In Commonwealth medical units dried plasma was in use, and dextran had also been on trial.

A convalescent training depot was situated close to 29 General Hospital, but on a site near the Kure docks which was not ideal, and there was a delightful convalescent leave station at an attractive hotel at Miyajima, one of the wooded islands in the Inland Sea.

I visited the U.S. base hospital in Tokyo (1,000 beds) occupying a modern hospital building which was formerly a civil hospital built from American funds. Here good surgery was done by a U.S. Medical Corps neurosurgical unit, to which all Commonwealth cases were sent.

Mobile Army Surgical Hospitals

In Korea I visited hospitals at Seoul and Pusan and the U.S. mobile army surgical hospitals (M.A.S.H.), which correspond to our C.C.S. These carried out all forward surgery for our troops as there was no Commonwealth C.C.S., and two M.A.S.H. serve the Commonwealth Division, one U.S. Medical Corps, and one Norwegian. They had tented wards which were comfortable, being warmed with the latest type of petrol heaters. There was a team of surgeons and anaesthetists on the C.C.S. and field surgical team pattern. I saw some excellent operation results following very severe wounds, and these successes were partly dependent on rapid methods of evacuation.

A special feature of this speed of evacuation was the presence of helicopters employed solely in casualty evacuation at the M.A.S.H., the pilots actually living in the medical mess. This was an excellent arrangement, as not only were the pilots immediately on call but they became steeped in the medical atmosphere. These helicopters flew under almost ideal conditions, as no hostile enemy aircraft came up to interfere. They have saved many lives by evacuating from advanced dressing stations of field ambulances, and even from regimental aid posts. At one R.A.P. I was shown the drill for calling up a helicopter to evacuate a priority casualty, and this efficient and speedy method of evacuation served to raise the morale of the fighting soldier.

One M.A.S.H. was located close to the 38th Parallel, and I was made an honorary member of the 38th Parallel Medical Society, which was started by the surgeon of an American Corps, and which holds meetings to discuss clinical cases and administrative medical problems. It served the excellent purpose of a common meeting-ground for the medical officers of all the United Nations Forces in Korea.

Commonwealth Division Medical Units

The Commonwealth Division medical units were of the orthodox pattern—three field ambulances (one British, one Canadian, and one Indian) and a Canadian field dressing station. The F.D.S. located in a school at Seoul treated the divisional light sick and played an important part in preventing the evacuation of such cases to Japan. In addition, all field ambulances under existing circumstances were also holding the lightest types of sick under tented conditions. A noteworthy feature was the growing policy of treating patients suffering from all types of V.D., and other diseases, either as out-patients or in the forward medical units, and these included types of cases which formerly were thought to require hospital treatment. The success of such a policy was entirely due to the efficacy and rapid curative powers of the new antibiotics. Even the R.M.O.'s armamentarium was being improved to an extent which allowed him, under static conditions, to hold and treat types of case which formerly were evacuated.

The field ambulances were deployed to form casualty-collecting posts and advanced dressing stations. The Indian field ambulance—a parachute unit—has served with a British brigade with great success. The C.O. has been awarded the Indian equivalent to the D.S.O. for his work during the last 15 months, and the unit which I inspected was highly efficient. The Indians withstood the winter conditions remarkably well, and their morale was high The Canadian field ambulance was running well-organized wards for the light sick, with a lavish use of some of the more expensive antibiotics, which for the British Army cost so many dollars. The British field ambulance has an excellent record of service since the beginning of operations, and both the C.O. and the second in command had received American decorations.

Six of the battalion medical officers were visited, including those of two Canadian and one Australian battalion. The R.M.O.s with British battalions were all National Service, and were keen and well thought of by their commanding officers. It was interesting to see these young medical officers so obviously identifying themselves with the *esprit de corps* of their own battalions, as indeed they should. The R.A.P.s of battalions in the line consisted of sandbagged dugouts familiar to all who have served in the world wars. Casualties were brought back to R.A.P.s by company jeeps rather than by stretcher-bearers, and evacuation from R.A.P.s was by ambulance cars, mostly of the jeep type.

The winter of 1951–2 was a mild one compared with that of 1950–1, and during the truce talks the front-line troops were not experiencing a war of movement, so there had been little exposure to severe winter conditions and casualties due to the effect of cold had been very few. A small number which occurred in one battalion were immediately brought to an end when strict foot drill and changing of socks were enforced.

Evacuation of Casualties

At Seoul a United States Army Evacuation Hospital accommodated in a fine school building has 1,000 beds, and receives all Commonwealth cases for evacuation to Japan. They proceed either by plane from Kimpo airfield near by, or by ambulance train to the base at Pusan. The Royal Australian Air Force has a fine record of achievement in air evacuation.

At Pusan I visited the Swedish Red Cross Hospital, which treated Commonwealth patients from this base area. Many Korean civilians were being treated in available beds, and several were seen recovering from extensive burns resulting from fires, which occurred frequently in their wooden habitations. Much excellent medical work was done for civilians in the United Nations hospitals, and at the U.S. Army M.A.S.H.s it was interesting to see many Koreans receiving expert surgical care and treatment.

Evacuation to the U.K. or to Australia or Canada from 29 General Hospital was carried out mainly by air. The speed of air evacuation assisted the definitive treatment of long-term cases. The R.A.F. Medical Services employed Hastings aircraft, staging at Singapore and other stations *en route* to the United Kingdom. Not only Commonwealth troops but those of many other United Nations countries were being evacuated: French, Belgian, Turkish, Greek, and Abyssinian cases were sent to their respective countries either by R.A.F. plane or by our troopships.

Health Under Winter Conditions

The general health of the troops during the winter was excellent. The cold was often dry and stimulating, with sunshine and blue skies. As billets, the tents and dugouts were made warm and comfortable by the petrol heaters in use.

One of the lessons apparent from this war is the improvement which has taken place in heating and cooking equipment, especially items of American pattern. It was noteworthy how eager British units were to acquire American equipment.

There were no complaints on the scale of winter clothing, which had certain items that were an improvement on those of the previous winter. The rations were pronounced excellent, and included a daily allowance of 10 oz. (285 g.) of meat.

The advent of the newest antibiotics has made some of the previous drugs out-of-date and unnecessary, and this process must be expected to continue. This means keeping a close watch on the supply side in Army medical equipment depots and avoiding the building up of too large a reserve of any particular drug, which may become outdated.

It was a pleasing feature to see the close co-operation with the U.S. Medical Corps at all levels. I visited the headquarters of the 8th Army and of the American Corps of which the Commonwealth Division is a part, and found the surgeons of both fully appreciative of the Commonwealth medical problems and arrangements. I was able to pay a tribute to the U.S. medical authorities for their active and efficient care of all our wounded carried out at the M.A.S.H.s since the beginning of hostilities.

The Commonwealth medical services in Japan and Korea were competent and well equipped, and, with excellent U.S. Medical Corps co-operation, our casualties were well cared for.

According to a report in the *New York Times* (November 13) the Supreme Court of New York County is instituting an inquiry into reports that a number of drug companies were violating anti-monopoly laws by peddling shares of their stock to members of the medical profession, with the understanding that the stockholders would prescribe those companies' preparations in preference to products marketed by competitors. An action against one pharmaceutical company has already been started.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

R.M.B.F. Christmas Gifts Fund Appeal

SIR,—The distribution of Christmas gifts will be made in a few days. I ask your readers who have not yet responded to the President's appeal (October 11, p. 830) to forward their contributions as soon as possible to the Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, marked "Christmas Gifts."

I hope there will be a very generous response to this reminder.—I am, etc.,

F. A. JULER,
Honorary Treasurer.

London, S.W.15.

Cross-resistance between "Daraprim" and Proguanil

SIR,—It has been reported by Rollo[1] that laboratory strains of *Plasmodium gallinaceum* and *P. berghei* made resistant to proguanil could be successfully treated with pyrimethamine ("daraprim"). We have been unable to confirm this with our proguanil-resistant strain of *P. gallinaceum*, which has proved to be markedly resistant to pyrimethamine, and we have now had the opportunity of showing that cross-resistance may also occur to *P. falciparum*, although Wilson's[2] preliminary results in Malaya had suggested that schizonticidal resistance to proguanil does not influence the probable response to pyrimethamine.

We obtained a strain of *P. falciparum*, at least partially resistant to proguanil, with the co-operation of Drs. Edeson, Field, and Wilson, of the Institute for Medical Research, Malaya, who had shown that it was refractory to treatment with proguanil. We have now been able to demonstrate in volunteers that it is also resistant to treatment with pyrimethamine. The results, briefly, are as follows:

(1) Four European volunteers were given 25 mg. of pyrimethamine (the present recommended suppressive dose) at the time of first being bitten by infected mosquitoes and again a week later. All four developed overt malaria within 12 days of the first bites. Subinoculations were made in each case on the seventh day, and all the recipients developed overt malaria. Admittedly, irrefutable evidence of cross-resistance between the two drugs is provided by these results only if it is assumed that the dosage regime of pyrimethamine used would have been effective with the parent (non-resistant) strain. But they certainly suggest that such cross-resistance exists for two reasons. First, the overt attack in each volunteer occurred within the usual incubation period of *P. falciparum*, and there was no indication that pyrimethamine had influenced the course of the infection in any way. Secondly, in later experiments (see below) the resistance of the blood parasites to treatment with pyrimethamine was demonstrated.

(2) Two African volunteers, each given 25 mg. pyrimethamine 72 hours after being bitten by infected mosquitoes, and a third, given 100 mg., also at 72 hours, all developed malaria within the normal incubation periods, so demonstrating complete failure of causal prophylaxis. In similar experiments with an African strain of *P. falciparum* pyrimethamine was entirely successful in preventing the development of parasites.

(3) Two European volunteers (recipients of the subinoculations made in the first experiment) with parasites in their blood showed no clinical response when treated respectively with 25 mg. twice daily and 50 mg. once daily. Parasites continued to increase in number, and by the third day in one case and the fourth day in the other the patients were so ill that the treatment had to be changed and chloroquine therapy given.

(4) African volunteers given 50 mg. once daily for three days, or 50 mg. twice daily for three days, continued to show parasites in undiminished numbers for four to six days *after* treatment with pyrimethamine was discontinued. Other volunteers could not be observed so long because they became too ill and the treatment had to be changed to chloroquine.

A full account of the work will be published later.—We are, etc.,

G. I. ROBERTSON.
D. G. DAVEY.
N. HAMILTON FAIRLEY.

Nairobi.

REFERENCES

1 *Nature, Lond.*, 1951, **168**, 332.
2 *Trans. roy. Soc. trop. Med. Hyg.*, 1952, **46**, 499.

Education of the Epileptic Child

SIR,—I refer to your annotation on the "Education of the Epileptic" (October 11, p. 823) and to Dr. Denis Pirrie's letter (November 15, p. 1097).

At the residential special school at Lingfield Colony we have 280 epileptic children. Nobody is more anxious than I to avoid separating a child from his parents in order to attend a residential school. In pursuance of this I have great reluctance to admit children without clear proof that they are unable to attend ordinary school, and with the children already here I return them home when their fits have been arrested or sufficiently controlled for 12 months. In the meantime it is my policy to keep the parent–child relationship alive by frequent holidays, visiting, and correspondence.

I feel that Dr. Pirrie is completely ignoring some well-founded and accepted facts about the education of epileptic children. There may be differing views regarding the emotional upset caused to normal children by the sight of an epileptic fit, but I myself have no doubt that it is sufficiently significant to make its avoidance highly desirable. I did not think, however, there was any doubt about the unfortunate effect upon an epileptic child of his own realization that he is different from everybody else, and, in the many ways mentioned in your annotation, the outcast among them.

A surprisingly large number of children suffering from frequent fits on admission to Lingfield Colony cease altogether and at once, either permanently or for a long period, without any alteration in their medication. This seems to me to be the effect of removal from the stress of existence in a normal school and home. To reverse the situation by trying to train the general public not to be upset by an epileptic fit, at the expense of the epileptic child, is surely shortsighted, to say the least. We at Lingfield have ample evidence of the fact that epileptic children, handled without knowledge by well-meaning parents and teachers, develop an attitude to life which is maladjusted. The child becomes egocentric and temperamentally difficult. It is argued that this situation is part of the epileptic syndrome, or is a reaction to the realization of his disability; but however genuine may be the existence of these two factors there is, without doubt, an overlay which is no more nor less than the spoilt child demanding the whole attention of his environment and kicking against its refusal. For instance, a boy at our school, aged 12 and a very intelligent pupil, from the beginning was difficult, continually fighting his fellow pupils and frequently absconding. Eventually it was discovered that the underlying reason for his behaviour was that he strongly resented being treated "normally" and his fits being regarded as just momentary interruptions in his work. At his previous school, when he had had a fit the rest of the class had been told to read their library books, the teacher had gone for his car, and the boy had been taken home to enjoy a holiday for the rest of the day. As a provider of "free periods" for the rest of the class, he had been popular, and he had enjoyed his car rides home and the holidays. In an epileptic school, of course, he is now a normal member of the society in which he lives.

It has been recognized by the Ministry of Education that the epileptic requires more attention than the ordinary child, and this has been provided for in special schools by limiting classes to 20. To keep an epileptic child requiring colony treatment from an epileptic colony is to deny him this advantage and leave him to try to struggle in a class of 40 or 50, which will be a constant fit-precipitating stress. Of course the outstanding value of an epileptic colony is that it provides treatment under proper observation. Treatment from the out-patient department of a hospital can be extremely unsatisfactory owing to the notorious irresponsibility of many epileptics and their parents as regards their drugs and other therapeutic measures, and the unreliability of their reports. In-patient treatment would be an impossible load on hospitals because of the prolonged observation necessary.

Provision already exists in the mental deficiency institutions for mentally defective epileptics, but a group for whom there is no provision is the one into which fall those who are not defective in the legal sense but are below the I.Q. level of 60–65, under which most epileptic colonies do not admit. In the course of a building programme already started at Lingfield Colony separate provision is being made for those who fall between the two stools, and this, in addition, is going to enable us to provide the better for the more intelligent child. In the same programme we are providing separate accommodation for the difficult child, which, while it will not enable us to admit the frankly delinquent child, will make it unnecessary for us to discharge many with whom we cannot now cope.—I am, etc.,

DENIS G. KENNEDY,
Medical Superintendent,
Lingfield Epileptic Colony.

Lingfield, Surrey.

Vaccination Technique

SIR,—In Part II of the Refresher Course article on "The Diagnosis of Smallpox" (November 15, p. 1090) Dr. Thomas Anderson states that no dressing is required to the site of vaccination.

In view of the fact that cases have been reported of eczematous children coming into contact with active vaccination sores and developing fatal accidental generalized vaccinia—for example, the case reported by Dr. M. L. Assinder (August 16, p. 394)—I feel that it is an obligation on our part to apply a dressing in all cases, in order to prevent the possible development of a fatal disease in a susceptible child.—I am, etc.,

London, S.E.13. HARRY G. JEFFS.

B.C.G.

SIR,—I am writing this letter in the hope that it will catch the eye of the anonymous physician who took part in a broadcast on tuberculosis in children in the B.B.C. Home Service on November 14. In reply to the question, "Will B.C.G. prevent tuberculous meningitis?" his answer was a plain unqualified, "No, I don't think so." I therefore request that you will afford him an opportunity of amplifying his answer by stating the number of successfully B.C.G.-vaccinated children he has records of and the number of these who have contracted tuberculous meningitis.—I am, etc.,

Belfast. H. G. CALWELL.

The Catheter and the Prostate

SIR,—Formerly the sudden emptying of an over-distended bladder was regarded as highly dangerous because it might precipitate a fatal haemorrhage. Now it is held that such a haemorrhage is due not to the abrupt fall in pressure but to the introduction of infection, despite the fact that no other form of urinary infection shows haemorrhage on such a scale. So the surgeon eschews the catheter, takes the patient straight to the theatre, and empties the bladder while he removes the prostate, confident that he is doing the right thing so long as he operates on a virgin field.

Removal of the prostate under strictly aseptic conditions is an end to be aimed at, but it seems a little doubtful whether it has yet been achieved. The hateful catheter must be used after the operation if not before, and when the catheter is used infection cannot be avoided. Of the patients operated on "aseptically" four out of five are grossly infected when they leave hospital, and the fifth is only sterile because he has been treated with streptomycin for some dire complication—that is, pyelonephritis. In spite of all precautions no patient escapes gross infection and 20% develop a very serious type of infection. It is fair to assume that this infection is present before the catheter is removed on the fifth post-operative day in the ordinary case, and that it commences some while before that—in fact not very long after the time of operation. Is it worth while then taking a uraemic patient straight to the theatre in order to operate on a field which, though clean at the moment, is bound to become contaminated so soon?

There is another matter to be taken into account. In some of these cases prolonged back pressure is apt to produce an atonic bladder, and when the catheter is removed on the fifth post-operative day micturition is not restored. The catheter must be reinserted and perhaps left for as long as two or three weeks before the bladder regains its tone and the patient learns to pass water without help. Would this enforced drainage not be better before operation rather than after, when the defences have been breached and the prostate bed is raw? Is there not still a place for cystotomy in the bad case? Or for catheterization carried out with the full ritual of asepsis in a well-equipped hospital ward? Whatever the inadvisability of catheterization in the home, surely catheterization in hospital can be carried out without mishap? Should the worst happen, an infection limited to the lower urinary tract is rarely fatal. If the drainage is uninterrupted and the patient is kept in the erect position, whether sitting up in bed or up and about the ward, the chances of ascent are minimized.

We congratulate ourselves on losing far fewer of these patients than we used to, but there are other reasons for this than midnight operations. Improved anaesthesia, close attention to fluid and electrolyte balance, and scrupulous care that drainage, whether before or after operation, is maintained without the slightest interruption play their part. Antibiotics must be given more credit than anything else for lowering the mortality of the operation. Even in "aseptic prostatectomy" streptomycin seems to play a leading role.

No one passes a catheter or a cystoscope unnecessarily on a "prostatic," but, if the alternative is an immediate operation on an ill patient who has never been seen before, one may be excused for being old fashioned. Delay not only allows for reasonable investigation and preparation, it often leads to the discovery of some vital fact that might be completely overlooked on the journey between the ward and the theatre.—I am, etc.,

London, W.1. STEPHEN POWER.

Kwashiorkor

SIR,—Recent animal-feeding experiments and the articles on kwashiorkor (October 11, p. 796) demonstrate forcibly the necessity for providing infants and children with large quantities of protein during their rapid growth period. This protein must not only be economically available but must also be biologically suitable to the human organism. Two factors to be taken into account are (*a*) the ingestion of suitable protein with the various additional factors (vitamins, etc.), and (*b*) the intestinal flora which utilizes the amino-acids for resynthesis, and manufactures vitamins, etc., and various other biochemical reactions not yet evaluated.

Thus the problem of kwashiorkor can be dealt with along two lines: (*a*) The provision of animal protein by giving meat or meat products, which automatically adds the necessary additional factors and does away with the need for complicated diets. This is balanced nutrition and is ruled out by economic difficulties. (*b*) Modification of the intestinal flora to receive non-animal protein so that extra synthesis can take place in the gut. That the human organism can take in large amounts of non-animal protein and manufacture its own vitamin is a tribute to the adaptability of the human body. That this strain is unequal in growing children is shown by the diarrhoea and unformed stools in the early treatment of kwashiorkor with vegetable protein.

However, if the gut is first made receptive by a course of succinylsulphathiazole and then a suitable bacterial culture is swallowed, the bowel becomes modified to meet changing conditions, and the intestinal flora, differently constituted, can deal with larger quantities of vegetable protein with the resultant synthesis of vitamins and other factors. It is along these lines that further progress in nutrition can take place.—I am, etc.,

Watford. CHARLES ROTMAN.

Paralytic Ileus

SIR,—The article on "Relation of Electrolyte Changes and Adrenocortical Activity to Paralytic Ileus" by Dr. D. H. P. Streeten and Mr. J. N. Ward-McQuaid (September 13, p. 587) must give cause for intensive thought. As one who has had considerable success in dealing with this post-operative catastrophe I commend the writers for their careful investigative approach but take the liberty of disagreeing with their interpretation of their findings.

In a patient who loses chlorides to excess by vomiting and suction there must be a transference of intracellular potassium into the blood stream, and if this is so potassium excretion via the kidneys will become excessive. In 5 of 10 cases they found intracellular depletion of potassium. It is interesting to find that in patients with lowered sodium and chloride levels in the blood stream there are also positive indications of enhanced adrenocortical activity in the form of eosinopenia and increased excretion of 11-oxysteroids.

I think it would be wrong to interpret this increased activity as being the proximate cause of the ileus through an acceleration of potassium excretion. After all, eosinopenia indicates nothing more than that the adrenal output of hormones is sufficient to banish these cells from the circulation. My view is that the adrenocortical activity is the direct response to stressor factors and that the output of hormones, while being the maximum of which the individual glands are capable, may be quantitatively far short of the amount required to counteract the stress. Augmentation of the patient's output by parenteral administration of hormones will pay dividends and will lead many patients out of the danger zone in a rapid and dramatic manner. Naturally it is necessary at the same time to replace potassium and balance the electrolytes as part of the therapy. If a test is required which will assess the danger and give an index of response to therapy it is contained in the recording of the blood urea. In all these cases the initial figure is high and with favourable response to therapy the fall is steady and sustained.

We are still left with the necessity of elaboration of a theory which will account for the post-operative intrusion of acute paralytic ileus. I believe it to be a histamine effect and that this noxious amine is generated from histidine in the bowel contents by putrefactive organisms which happen to be present in the particular, but not in all, individuals. The theory is capable of a great deal of supportive argument, but this is not possible in a letter of this description.—I am, etc.,

Durban, S. Africa. J. DRUMMOND.

Removal of Sutures

SIR.—Dr. Geoffrey Barber's suggestion (November 15, p. 1103) of using a knife instead of scissors for removing sutures seems an excellent one. A further refinement I have found valuable is to leave the stitches *in situ* after they have been cut. The majority work out painlessly in a day or two, the others can be picked out without any sticking. Apart from the prevention of pain, this device obviates any split-

ting of the wound or oozing from the edges or the stitch holes as a result of tugging on the divided stitches impeded by the presence of adherent dried blood. Incidentally, this tugging may cause as much pain as cutting the sutures with scissors. If tension or mattress sutures have been used the advantage is even greater, the divided stitches still giving a little reinforcement to the wound, which is not left completely unsupported in one fell swoop but is allowed to flatten out gradually as the stitches slowly relax. For the same reason, in long mastectomy wounds alternating stitches should be cut judiciously in three or four instalments, at each cutting the previously divided stitches being picked out. This procedure, together with Dr. Barber's, will rob "stitches" of all their terror.—I am, etc.,

London, W.1. A. DICKSON WRIGHT.

Postgraduate Training of Overseas Graduates

SIR,—Having read the excellent article on postgraduate education by Sir Francis Fraser (August 30, p. 455), and also the excellent reviews in the same number of your *Journal*, I would like, as a junior member of the staff of one of the Universities in India, to offer my criticisms of the facilities for postgraduate training of graduates from overseas—especially those from the Far East.

We have undergraduate teaching colleges, but we rely upon you for the training of our postgraduates. The West, especially England, is looked upon by the East as the temple of medical sciences. What is the West contributing in way of inspiring the art of teaching medicine? Perhaps a lot, but the younger generation of to-day feels dissatisfaction with the way in which the various teaching courses are organized. Are six weeks' intensive theory, week-end courses, and clinical conferences sufficient? Will a person trained thus be fit enough to teach or impart knowledge to others? Most of these courses concentrate on the points favoured by a particular examiner and the "regular" patients and the few odd potted specimens. If successful in the examination at the end of such a course, the candidate thinks of returning home and ignores the excellent opportunities for practical training offered to him under the new scheme. The student community are to blame, because they become the moving advertisements of certain coaches or courses for a particular diploma. The teaching hospitals are to blame for running diploma courses instead of postgraduate training as described in your *Journal*.

I would say that various teaching hospitals in London or outside are not serving a very useful purpose by running diploma courses, while much of the clinical material is being wasted, not only in London but all over the country. The very pattern of these courses does not agree with the present concepts of postgraduate training as defined in your *Journal*. I would therefore appeal to the senior members of our profession to reorganize the postgraduate courses run in these hospitals, with a view to training and not for any particular examination. Such courses should run for longer terms, say, six months at least, and any graduate with some clinical background should be allowed to attend. This would not only reduce the number of recent graduates who return prematurely, but also provide postgraduate trainees who would be an asset to their country, even if unsuccessful in obtaining a diploma. A bad examinee can be a good trainee and later on prove to be a good clinician.

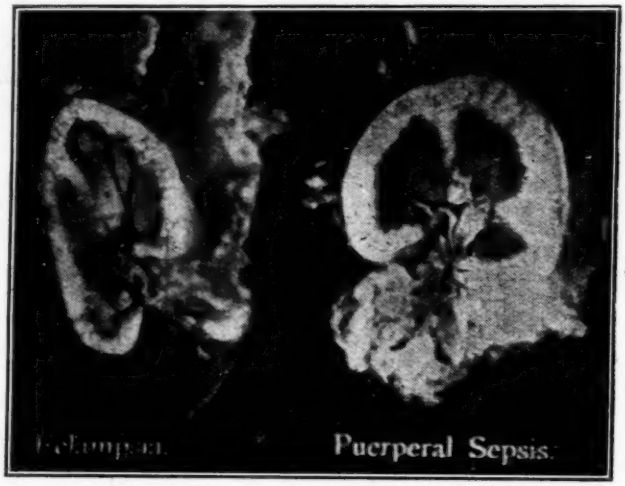
May I make it clear that I am not criticizing the system of higher examinations, but the way in which a candidate is prepared for them? It is now necessary in England, before reaching the stage of senior registrar, to have practical experience in a special field and a higher general qualification. For those coming from abroad, straining at higher qualifications, it serves no useful purpose, because after a hard struggle on limited resources for two or three years both the successful and unsuccessful return home at the same stage of their practical training as they were at prior to coming to this country.

I hope serious consideration will be given to this problem, because we, coming from abroad, entirely depend on your country for our postgraduate training. You are fortunate in establishing contacts with American and Continental colleagues. Let us have the opportunity of being accepted as your contacts, and learn from your restrained practical outlook. Allow us to be linked with you as members of the Commonwealth of Nations on the same footing as Australia, New Zealand, Canada, and South Africa.—I am, etc.,

Alton, Hants. R. N. SHARMA.

Block for Bisecting Kidneys

SIR,—I was much interested in reading Dr. R. A. McInroy's letter (November 8, p. 1045) on the above. The advantages of such a block for obtaining really flat surfaces and avoiding injury to one's hand are apparent, and it should be of value in the preparation of museum pieces—for those content to inspect longitudinal sections. But there is another way of incising the kidney which perhaps is even more instructive, and that is by dividing it transversely. The



present block could easily be modified for that purpose by making vertical slits in its sides like those at its ends.

Longitudinal sections of the kidney are excellent for inspecting the cortex and medulla, but they do not indicate how the cortex envelops the medulla as will transverse sections. On looking at a longitudinal section of the kidney the cortex and medulla might be separate parts of the organ, as they seem to be in the case of the suprarenal body. There is no suggestion, such as is given by a transverse section, that a physical relation between the two exists, or may exist. With transverse sections, the idea that if the blood cannot readily traverse the cortex it must be thrust into the medulla becomes possible. Moreover, with longitudinal sections there is no indication that during life the kidney may have been more compressed in one case than in another. Transverse sections do at times suggest this.

The accompanying excerpts from a film made several years ago on the "Kidney in Eclampsia" show a transverse section of a kidney from a case of eclampsia side by side with one from a case of puerperal sepsis. The appearances are greatly different—in the one the kidney looks as though it had been compressed, in the other it appears distended. Such difference, I think, would not have been indicated by longitudinal sections.—I am, etc.,

Rugby. R. H. PARAMORE.

The Patient's Verdict

SIR,—Dr. David Hardie's criticisms (November 22, p. 1151) of Lord Moran's opinions, as expressed in his Harveian Oration, emphasize the importance of the present moment in the history of medicine. It seems that Lord Moran would have us believe that progress based on science is automatic—a view that is untenable now that it is clear that much of scientific advance is only progress towards destruction.

Dr. Hardie, on the other hand, stresses the essentially religious basis of medicine, and recalls us to a more kindly and more humane philosophy.

It is surprising that neither Dr. R. W. Cockshut (November 1, p. 993) nor Dr. Hardie have called attention to the grave insult to general practitioners contained in Lord Moran's Oration: "And the system of merit awards to specialists means that in the future their promotion would depend less and less on the patients' likes and dislikes and more and more on the verdict of their fellow consultants." The success of consultants has always depended upon the opinion of their professional brethren: it is only to the consultant who can "deliver the goods" that the general practitioner will refer his patients, and no consultant sees private patients who are not referred to him by another doctor. Is Lord Moran perhaps confusing consultants and "consultoids"? And is he excluding general practitioners from the concept of "members of his own profession" who should judge the quality of a consultant?

The system of so-called merit awards has not, so far as the profession as a whole knows, much to do with the doctoring ability of a consultant. Admittedly, the whole of the deliberations of the Distinction Awards Committee are carried on in the strictest secrecy, so that we do not even know what is meant by "merit." Is it something that the consultant has done? Or is it something that the committee hopes he will do in the future? And, if the latter, is it something that will benefit the patients of to-day or is it a long-date investment—something that *may* come out of to-day's "research"? My thesis is that general practitioners, who have to live among the results of consultants' treatment, are much better judges of specialist treatment than are "fellow consultants," and that in the past, which Lord Moran seems to regard as so dark, the success of a consultant did depend on the judgment of those members of his own profession who are most competent to form an opinion on the subject.

We cannot go back to the old days, but we can surely do something towards improving the present system. The plan for a medical service as propounded years ago by the B.M.A. was infinitely better than the present mess; and the Willink plan, with all its defects, would not have prostituted medicine as has the Bevan scheme.—I am, etc.,

London, W 1. A. PINEY.

Is Boxing Safe for Schoolboys?

SIR,—In my capacity as medical officer to various boxing associations I have examined many hundreds of schoolboys for physical fitness for boxing. I can say that the percentage of deviated septa and chronic sinusitis is no higher in seniors than in novices. I have asked leading E.N.T. and plastic consulting surgeons and they agree with my findings.—I am, etc.,

London, S.W.19. J. L. BLONSTEIN.

"Et All., etcc."

SIR,—Professor J. W. Howie (October 18, p. 883) would seem to have forgotten that the word "etc." is an abbreviation of the Latin "*et cetera*," meaning "and the other things" or "and the rest." Hence "etc." is already in the plural. Hence Professor Howie's suggestion of "etcc." can only be regarded as his attempt at a reduplicated plural meaning "and more than the rest," no doubt a pretty thought but a term ridiculous in itself, and, of course, from the grammatical point of view unknown in the Latin tongue. One cannot have "more than the rest" of anything, unless, indeed, Professor Howie's "etcc." is interpreted in the same sort of sense or nonsense as the familiar "much of a muchness" occurring in *Alice in Wonderland*. It remains clear that "*et al.*" should be used to mean "and another" and nothing else; if the meaning "and others" is wanted "*et all.*" should be employed. Both are space-saving abbreviations for the printer.—I am, etc.,

Nairobi, Kenya. A. J. JEX-BLAKE.

Hunterian Society's Debate

SIR,—I wish to call your attention to two errors in your account of the above debate (November 29, p. 1202). First, I am reported as saying that "medical statisticians . . . were followed by a breed of psychiatrists who inquired into the mental processes of the statisticians. . . ." This is obviously untrue of the present day. I was painting a fanciful picture of the future. Secondly, your account ends with this quotation: "Never was it more difficult than now (owing to birth control) to get oneself conceived, but, that obstacle overcome, never was it more easy to join the human race or more difficult to leave it." These words are attributed to Mr. Dickson Wright. They were mine.—I am, etc.,

Cambridge. FFRANGCON ROBERTS.

⁂ We apologize to Dr. Ffrangcon Roberts and Mr. Dickson Wright for the errors in our report of the debate.—ED., *B.M.J.*

POINTS FROM LETTERS

Insulin Injections

Dr. HERMON WHITTAKER (London, S.E.10) writes: Diabetics giving their own injections are usually taught to pinch up the skin with the fingers of one hand and push the needle through the slack skin. Some—children in particular—find this difficult. The skin yields to the pressure of the needle point and hesitation may cause pain. There is an alternative, for which no originality is claimed. Instead of pinching up the skin, the child is taught to stretch the skin between the spread fingers and push the needle at right angles to the taut skin. With the popular 20-gauge needle there is small chance of pricking the thigh muscles. It is easy to guide the child's hand and the needle is in almost before pain is realized.

Foreign Body in Thigh

Dr. A. FRY (London, S.E.25) writes: The following case may be of some interest as it shows the danger of leaving loose needles about. A female patient was referred to me for an *x*-ray examination. About five weeks previously, while in a bus, she felt a sudden "sting" in her thigh following a knock by her shopping carrier, in which were tins of food. When she got home she noticed a drop of blood on her thigh at the site of the sting. It became painful a few days later and she consulted her doctor. . . . After two to three weeks' treatment she developed a painful swelling. The skiagrams showed the presence of a needle in the antero-internal aspect of the middle of the thigh near the femur. There must have been a loose needle in the patient's underclothing and the knock by the shopping carrier in the bus caused the needle to enter the thigh. . . . This shows the importance of always bearing in mind the possibility of a foreign body in the tissues in any unexplained sudden pricks or "stings" followed by discomfort on movement.

Lumbar Lesions

Dr. JOHN HEGINBOTHAM (Stockport) writes: What surprises me is the frequency with which "complete" rest in bed is prescribed (*vide* Mr. R. S. Henderson, September 13, p. 597). A considerable proportion of beds still in use at patients' homes have the paraboloid mattress slung from head to foot, often with a surprising sag. Added to this, the patient tends to sit up in bed, eating, drinking, reading, etc., to alleviate the boredom. My own practice is to discourage bed, salicylates, physiotherapy, and counter-irritants, since these tend to perpetuate the belief in a "rheumatic," "fibrositic" or similar causation, responsive to medical treatment. I forbid patients to stay in bed, and, even more strongly, to read in bed (e.g., at night) or drink early morning tea there, unless they are prepared to use a feeding cup, with the head firmly glued to the pillow. Getting up must be done from the prone position, since most patients agree that the worst pain of the day follows getting up in the usual manner. Lolling in an easy chair is banned, or sitting in any chair under which it is not possible to withdraw the feet prior to rising with the spine extended. Stooping is forbidden, even to poke the fire; the "double-knees bend" is stressed instead and the patient with stiff or painful knees is told to poke the fire sitting on a stool. I teach that heavy lifting must be done with the forearms resting on the thighs, and car cranking with bent knees and spread legs (the results of personal experience). Walking is encouraged in a "pompous" attitude, and sneezing, coughing, laughing, and straining at stool must not be done in a flexed position.

Obituary

J. J. D. KING, Ph.D., D.Sc., F.D.S.

The untimely death on November 22 of Dr. J. J. D. King at the age of 46 is a great loss to dental science. Not only was he a fine investigator, with most of the rare characteristics which ensure continuous discovery, but, what made his death more tragic, he was one of a very small band of workers in this field. Indeed, as a qualified dentist wholly devoted to research he held a position that was almost unique in this country.

In 1932, after qualifying in dentistry and practising for a few years, he approached Lady (then Mrs.) Mellanby with the object of entering dental research because of his dissatisfaction with practice. He persisted in this desire in spite of all the difficulties which were impressed upon him. He had had but little special scientific training except for the six-months course in bacteriology under Professor Tulloch at St. Andrews University as part of the course for the diploma in public dentistry. Lady Mellanby ultimately agreed to train him, and with a grant from the Medical Research Council he joined the staff of the Sheffield University Field Laboratory. The fact that he was a nephew of the eminent physiologist the late Sir William Hardy seemed to be a promising augury which was later fully justified.

He soon showed himself to be an assiduous and competent worker, and after collaborating closely with Lady Mellanby for a few years he began to launch out on his own and soon became a successful and independent investigator. He was awarded the Ph.D. degree by Sheffield University in 1936, and a Beit Memorial Fellowship in 1939. Ten years later he was elected Fellow of Dental Surgery by the Royal College of Surgeons, and in 1950 he obtained the D.Sc. of London University. On the outbreak of war King joined the Army Dental Corps and was given facilities to investigate trench mouth. Later he was seconded to the Medical Research Council for further experimental work in gingival disease. This work was done in the Nutrition Building at Mill Hill, where the work of the Mellanbys had been transferred. It was this experience in the Army which directed his attention to parodontal disease and kept him very busy to the time of his death.

We are indebted to Sir EDWARD MELLANBY for the following appreciation:

By 1946 it was obvious that King had the qualities of initiating and carrying through first-class research, and the Medical Research Council decided to form a unit of dental research under his directorship. This unit was ultimately established at King's College Hospital Medical School, the school from which he had qualified in 1929. He had an uphill task in getting the unit going, partly because of the initially restricted accommodation and partly because of the difficulties in staffing a new project. These difficulties did not prevent him from doing good work on parodontal disease, much of which resulted from his discovery of the value of ferrets and golden hamsters as useful experimental animals for these studies. He also developed a capillary microscopy technique as a clinical aid for assessing gingival conditions. His early results emphasized the major part played by salivary calculus or tartar in gingivitis of all kinds, and to this problem he gave much attention. He showed that both nutritional and physical properties of the diet were responsible for tartar formation, and had he lived he would undoubtedly have been able to assign to each its own particular aetiological sphere. His last published paper is about an interesting experimental study of the production in ferrets of gingival hyperplasia by "epanutin" (sodium diphenyl hydantoinate), a condition similar to that produced in man by this substance.

It is impossible to describe here all King's discoveries in dental science, but reference must be made to his excellent survey of the dental condition of the children in the Island of Lewis published in the Special Report Series of the Medical Research Council. Most of King's publications were both well written and valuable contributions to knowledge, and they will be regarded no doubt in the future as one of the pillars of modern dental science. King was a good colleague and a man of retiring disposition, with all his energy and interests centred on his research. A few more like him would transform dental science and practice.

H. P. G. BAYON, M.D., Ph.D.

Dr. H. P. G. Bayon, who died at Little Shelford, Cambridge, on October 20, was a man of exceptional attainments. We are indebted to Professor CHARLES SINGER for the following appreciation:

The career of Dr. H. P. Bayon was so varied and so unusual that I think a few details of it may interest medical men. Enrico Pietro (Henry Peter) Bayon was born at Genoa in 1876. His father was a Swiss in the consular service, a member of a family that had fled from Paris in the Revolution at the end of the eighteenth century. His mother, Florence Farington, was a member of an English Quaker family concerned with the publishing trade. His early education was at Genoa and at a co-educational school of the Society of Friends at Sidcup. Thus he was bilingual from childhood.

He began his university life with a course in engineering at Genoa, after which he decided to study medicine. For this he went to Würzburg, which at that time was one of the very best scientific schools in Europe. He specialized in pathology, and his doctoral thesis of 1902 was marked as the best of the year. He then worked for several years as assistant in pathology at the University of Geneva. In 1905 he became an M.D. of Genoa. During these years he acquired complete facility in both German and French, thus becoming quadrilingual. At the end of 1905 he came to England and took a course at the London School of Tropical Medicine. This was followed by a series of voyages as a ship surgeon during which he visited South America, South Africa, and the Black Sea. On his return he held several pathological posts and was elected to a Beit Research Fellowship.

Between 1907 and 1910 he was a member of a sleeping-sickness commission in Uganda. There he made important pathological investigations of this and of a number of other tropical diseases. Stricken by one of these, he was carried by native bearers for several days to hospital, which he reached in a critical state. On recovery he continued his researches, taking now special interest in leprosy. In 1912 he became research bacteriologist to the Union of South Africa. Most of the next few years he spent on the minute and isolated Robben Island, 15 miles north-west of Capetown, where there was a leper colony. He was honoured by an M.D. *ad eundem* of Capetown University, and was sent by the South African Government to Imperial Russia for six months to study leprosy conditions. In this time he learnt a considerable amount of Russian. He was soon involved also in an extensive controversy concerning the segregation of lepers, a policy that he always supported.

At the outbreak of the 1914–18 war, having now also a British qualification, Bayon volunteered as a surgeon with the Red Cross and saw some service in France. In 1915 he obtained formal British nationality, for which both his personal history and his mother's origin gave him more

than ample claims. He then became pathologist to the British War Hospital, Napsbury, with its 1,000 beds. After the war and the closing of the hospital he went into general practice for a time before returning to pathology at the Molteno Animal Institute at Cambridge. During the last few years of his life he was very actively employed in investigating the diseases of fowls. His notes on this subject, completed on the day of his death, show that he had made more than 22,000 post-mortems on these animals. He obtained the Ph.D. of Cambridge University in 1938.

Besides being fluent in English, Italian, German, and French, Bayon could converse in Spanish, Portuguese, and Russian. Dutch he picked up while monitoring for the B.B.C., for whom he both wrote and delivered several broadcasts. Most remarkable of his linguistic achievements is to have passed the Colonial Office African dialects examination in several native languages. He was also an excellent Latinist. At a convention at Cambridge, when acting as a general interpreter, there was a Japanese member who contributed through him, their medium of exchange being Latin. He was moreover an accomplished naturalist, and in Uganda, South Africa, and elsewhere he collected numbers of insects, several of which were new to science and some named after him by the British Museum authorities. Perhaps his oddest discovery, made on his honeymoon in 1913, is that of a species of blind insect inhabiting a dark cave in Corsica.

In the last 20 years of his life Bayon took much interest in medical history. Like many who have exceptional facility in acquiring languages, he had not great literary gifts or powers of condensation, but his industry was tireless and his exceptional attainments gave him a range far beyond that of most historians. Thus he was often able to throw unexpected light on topics that might be thought quite exhausted—for example, he made some really striking discoveries concerning William Harvey and his method of work. The number and variety of his pathological writings are very large. I am happy in being able to reflect on many amicable discussions with him, from which I learned much on historic topics. In him the profession loses a man who was almost unique in his time in range of attainments. He is survived by his wife, two daughters, and a son.

W. WATKINS-PITCHFORD, M.D., LL.D., F.R.C.S. D.P.H.

Professor A. PIJPER, emeritus professor of pathology and bacteriology in the University of Pretoria, writes: May I somewhat belatedly—but that is due to the distance separating us—write a few lines to pay homage to the late Dr. Wilfred Watkins-Pitchford, whose obituary notice appeared in the *Journal* of October 11 (p. 834)? I owe too much to him not to feel the need to express my indebtedness publicly, and, although the approach to him was by no means easy, I have memories of him in which his goodness, natural friendliness, and helpfulness came uppermost. Our first contact was in 1913, when I, as a fresh arrival—and probably in his eyes very much a "foreigner"—applied for a position in the South African Institute for Medical Research, of which he had just become director. The interview excelled in briefness, for within five minutes I knew that I had better stick to private general practice on the highveld, which I did. But my good fortune made me acquire a laboratory outfit, and I started to write articles on pathology which I submitted to him in his capacity of editor of the *Medical Journal of South Africa*. And then the change came: he became very much interested in my work, he gave me the run of the library of his institute, and he did not think it beneath his dignity to spend hours with me correcting and improving the style and sometimes the contents of my contributions. In later years, always quietly helping me all he could, he saw to it that I received opportunities to lecture to the leading doctors and scientists of Johannesburg, and he was no doubt instrumental in obtaining for me an award from the board of the institute. All this was most valuable encouragement for a young man in a strange country at the beginning of his career. Still later, when I planned to settle in neighbouring Pretoria as a pathologist, which would at any rate mean a certain amount of competition with his beloved institute, it was Watkins-Pitchford who gave me every encouragement and support. He was not a man who easily befriended others, and he was not very ready with the outward signs of friendship. Even in those early days I had a feeling that he did not really want to be like that, for there were occasions when his kindly nature shone through his natural reserve. And of course he felt the responsibility of being the institute's first director very much. He did not smile readily, and the epithets "pompous" and "pontifex" bestowed on him by facetious people were perhaps not quite out of place. Yet there were other qualities behind that stern façade. Perhaps the aspect of Watkins-Pitchford's life that I have tried to illustrate here—his wonderful readiness to assist fellow scientists who needed help, encouragement, scientific advice, and material assistance—is new to some people. I shall always remember it in gratitude, and so I would like to place on record that I knew Dr. W. Watkins-Pitchford as a kindly and a noble man.

T. E. SAXBY, O.B.E., F.R.F.P.S.

We are indebted to Sir JAMES STIRLING ROSS for the following appreciation:

May I add some personal notes to your admirable record (November 29, p. 1208) of the life and work of Thomas Edmondston Saxby? He can only be known in terms of his beloved island. His grandfather, Laurence Edmondston, had been the island's doctor fifty years earlier. His mother, Jessie M. E. Saxby, was a great and gallant woman. Her doctor husband died young and left her with five boys to bring up. We can better understand her son Thomas when we read some lines that his mother wrote about herself when she was ten:

> I like to ride and climb the rocks.
>
> . . . .
>
> For I'm as wild as wild can be:
> There is no taming can tame *me*,
> And I go by the name of Wildie.

When Thomas was a student in Edinburgh in the early nineties he had already dedicated himself to the service of the crofters and fishing folk of Unst, with its 2,000 inhabitants. Full of mental and physical energy, he played an assortment of musical instruments in those days, some of them under strong protest from his Irish terrier. In 1898 he became medical officer for the island. The conditions for these brave islanders were rough and primitive: if he could not give them hospitals he gave them himself, with his horse and gig, his good legs for deep snowdrifts in the long dark winter, and his open boat and lugsail for the outer islands. He once took my sister with him and his "boy" out to Balta Island, where one of the fisher girls of the herring season was reported very ill. Off the land the wind rose strongly; sail had to come down and my sister had to sit on the sandbags, but the rough crossing was made. At Balta they climbed an iron wall-ladder to get on to the pier. He found that the lassie was all right again and was "back at the gutting"; but, as he had come, he would see her. That done, the row back was long and quite dangerous. That was just in his day's work.

His 50 years covered the transition from sheer medical privation, first to the Highlands and Islands scheme and then on to the National Health Service. Writing in 1950, he gave me a graphic account of the earlier years:

> "Before the H. & I. Board got to work (1913) there was absolutely no nursing service at all: patients had to put up with what attendance kindly neighbours could afford. Cases of serious illness had to be removed to Edinburgh Royal Infirmary, a journey sometimes taking five days. . . . Once the Board got to

work things improved very quickly and the old abuses were swept away." To-day "the hospital and specialist service works well; the Gilbert Bain Hospital at Lerwick has been a blessing. A patient can be got from here to Lerwick in a few hours. . . . We have a properly qualified nurse stationed centrally: she does most of the maternity work and is keen and efficient." He added, "I retired a year ago after 50 years: never off duty all that time and never had a rest. I am now 81½ years and perfectly healthy for my age."

That was not meant for publication, but let it stand. And that is what general practice can still be. Thomas Edmondston Saxby has added nobly to the long epic that began with the old words, "*Dispecta est et Thule.*"

SISTER KENNY

Sister Elizabeth Kenny died, at the age of 66, at her home in Toowoomba, Queensland, on November 30. She was well known in this and many other countries for her unorthodox methods in the treatment of the victims of infantile paralysis. Her methods gave rise to acute controversy, and many pages of this and other journals in the late nineteen-thirties were filled with articles and correspondence on the subject. Sister Kenny was a shrewd, combative woman, intolerant of opinions which conflicted with her own, but she was also a woman of deep compassion and one who sought no great reward for herself. In the setting up of Kenny clinics under Government auspices in Queensland, where free treatment was given, she refused to accept any remuneration for her services.

Elizabeth Kenny was born at Warialda, New South Wales, on September 20, 1886. She qualified as a nurse in 1911 and elected to work among children in the Bush area of her native Australia. During the first world war she served as a nurse with the Australian Army. When she returned to Australia she determined to make a special study of infantile paralysis, which she believed was being wrongly treated by the medical profession. Her methods, which she worked out in careful detail, were taken up in Australia and later in the United States, where the American Congress of Physical Therapy awarded her the Distinguished Service Gold Key. Briefly, the principles of the Kenny system, many of which were then as now endorsed by orthodox orthopaedic opinion, were as follows: maintenance of bright mental outlook; maintenance of impulse (by which was apparently meant the encouragement of the patient to make a mental effort to carry out a movement even when the muscles were so completely paralysed that no movement was possible); hydrotherapy and remedial exercises; maintenance of circulation; and the avoidance of the generally accepted methods of immobilization. It was with regard to this last that the chief controversy arose. Sister Kenny claimed that if there was no splintage at all the deformity, so frequent a sequel of the disease, was avoided.

In 1937, after 20 years' experience of her methods, Sister Kenny published in Sydney a book describing her treatment, with full technical detail. It was entitled *Infantile Paralysis and Cerebral Diplegia: Methods used for the Restoration of Function*, and it carried a foreword by Professor H. J. Wilkinson, Dean of the Faculty of Medicine, University of Queensland, in which he said it was possible that Sister Kenny had initiated a movement which would have far-reaching effects, and that she was highly to be commended for her persistence in it over many years. In the same year she visited this country and gave a demonstration at the House of the British Medical Association in London. She showed a film illustrating first the treatment of patients by orthodox methods, and then, for comparison, the results of the treatment of other patients by the Kenny method, and pointed out remarkable improvement in many cases. In reply to a question on that occasion she said she had not up to that time had a case which had not responded in some degree. The then Agent-General for Queensland, who presided, said he was pleased to represent the Government under which Sister Kenny had worked. He went on to say that many Australian doctors, who had at first harboured some prejudices, had now come round to her views and were supporting her. The Queensland Government had already established Kenny clinics, as also had the Government of New South Wales. In the Brisbane clinic up to that time between 500 and 600 cases had been treated, and nearly 100 of them had been discharged as cured.

In the following year, however, a Royal Commission in Queensland reported adversely on her methods, expressing the opinion that her system was not to be recommended at any stage of the disease. At about the same time (1938) the London County Council instituted a trial at Carshalton which lasted a year, and a report signed by Sir Harold Fairbank and other orthopaedic surgeons rejected her claims. It was stated in this report that in her avoidance of the generally accepted use of splinting she appeared to differ fundamentally from the orthodox view, also that there was no reason to admit her claim that complete cure could be promised in any group of cases of poliomyelitis. While those who signed this adverse report agreed with certain parts of her treatment, she was considered not to have faced the real issue of the residual paralysis, for which it was believed that surgical appliances or surgical methods such as stabilization operations offered the only help. In spite of these adverse verdicts, some 40 Kenny clinics came to be established in various parts of the world, five of them in the United States. Last year Sister Kenny published her autobiography under the title *And They Shall Walk* (reviewed in the *British Medical Journal* of April 12, 1952), but this was intended for lay people and did not enter into technical details. In this book she stated that she had at no time claimed to cure the disease and that the widespread publicity which had always attended her had resulted in claims being put forward in her name which were less than accurate.

We are indebted to Mr. H. J. SEDDON for the following appreciation:

The influence of Sister Kenny on the treatment of infantile paralysis has been exceedingly beneficial. One of the great misconceptions that gave rise to an immense amount of crippling was that strict immobilization was thought to be necessary in the early days of the disease. Sister Kenny went to the other extreme, and perhaps too far, in abandoning practically all forms of splinting; but she was undoubtedly on the right lines, and surgeons in many countries who have been influenced by her ideas in this respect are finding that their patients have much less muscle wasting and joint stiffness than formerly. She had a notion that muscle spasm was an important feature in the pathology of poliomyelitis, and this spasm might be found in muscles that were apparently completely paralysed—an obvious contradiction. What she described and talked about is an uncommon feature of poliomyelitis that has been well recognized for many years. She elevated it into an important aspect of the pathology of the disease, and thereby went

astray. She considered that the sovereign remedy for this so-called spasm was the application of heat by moist packs, and she developed a drill in the treatment of poliomyelitis that was elaborate, extensive, and tiresome. It was recognized 35 years ago that moist heat often relieved the pain that occurred in the early stages of the disease, but this was a very different thing from the employment of fomentation in practically every case, and after the first wave of uncritical enthusiasm most doctors who tried Kenny packing have given it up. Her third particular notion was one that she called mental alienation, by which she meant that much of the paralysis was not strictly organic but due to a loss of control somewhere between the higher centre and the spinal cord. This is only a new name for a whole variety of functional disorders ranging from straight hysteria to the simple clumsiness and feebleness of the convalescent patient. The idea itself was of no practical value, and has had no permanent influence in the designing of remedial exercises.

Sister Kenny was a woman with a mission, and she was so convinced she was right that she attacked all her critics mercilessly. It was useless to point out that her ideas about the treatment of poliomyelitis changed fairly rapidly as increasing contact with able medical people and other physiotherapists added to her initial small store of knowledge. But in an empirical way she hit on much that is good in the treatment of poliomyelitis, and her vigour was such that she wakened up orthopaedic surgeons and physiotherapists the world over. Had she been content to talk about treatment without embarking on speculations about pathology, and had she been a little kindlier and more tolerant, she might now be regarded as the Florence Nightingale of orthopaedics, or at any rate of that part of it concerned with poliomyelitis.

Professor ARNOLD LOEWENSTEIN, who died in Glasgow a few weeks ago, was born in Austria in 1882. Shortly after the last war he became a British citizen. He received his early training in Prague, and was assistant in the eye clinic of the German University for many years, when Professor Elschnig was at the height of his fame. A few months before the outbreak of war Professor Loewenstein sought refuge in this country, and a position was found for him in the Tennent Institute of Ophthalmology in the University of Glasgow. He worked there happily and increased his world-wide reputation for his enthusiasm and devotion to his chosen specialty. He was a man of wide culture and interests and became a great lover of the hills and mountains of his adopted country. He wrote with ease and facility upon a wide range of ophthalmological topics, and he was a patient teacher of students of all ages. He carried on a wide correspondence with the rising generation of ophthalmologists in various parts of the world, and his loss will be mourned by all.—W. J. B. R.

With the tragically sudden death on October 30 of Dr. W. G. OWEN, of Penygroes, Caernarvonshire, the people of Penygroes and a wide area round have lost a greatly loved and respected counsellor and friend. William Griffith Owen was born on September 27, 1892. After qualifying M.R.C.S., L.R.C.P. from the London Hospital in 1919, he returned to his native village. His winning cheerfulness, kindness, and tireless efforts on his patients' behalf soon won him the entire confidence and affection of an increasing practice. A fine, handsome man, "Willie" Owen, as he will always be to the many who mourn him, was *par excellence* a gentleman. For all his impressive stature and presence, he was, indeed, in every way gentle—in the soft, pleasant voice, in the deliberate and careful examination of a case, in the assertion of an opinion, which was invariably that of a shrewd, well-balanced, and experienced clinician, in advice or comfort to those many who sought his help either in sickness or in personal difficulty. His clinical judgment was well known to his colleagues to be of the first order, and his advice was freely sought. His opinion was the more valued in clinical and in wider professional matters in that it was known to be the result of a careful, unhurried consideration of all the factors involved. He was, perhaps, most himself as a family man. His liveliest pleasures were those he shared with his much-loved wife and his son, the simple pleasures of a day out to the sea shore, to a fishing stream, or a week-end in "Town"—Liverpool or London. Those who knew him best were privileged to see and admire and to share in this family spirit. A cheerful fellow, with a ready laugh of unhibited boyishness, he was the best of companions. The sorrow of his wife and his son, who has chosen to follow his father's profession, may be lightened in some measure by the knowledge that it is so widely and so deeply shared. —R. R. P.

B. H. writes: A year ago I met "Willie" Owen in the County Hospital, Bangor. He looked remarkably fit and healthy striding along, his powerful—rather heavy—chin thrust forward and his unbuttoned overcoat swinging behind him. His walk was resolute, and he looked resolute; in fact he was a most determined man who knew his job as very few know it. A self-made man practising in his own village, "Willie" Owen was known and loved by thousands of patients. They respected this great physician who had started from scratch and who had worked his way steadily upwards till he had the largest practice for miles around. I have never met a better diagnostician. One day he astonished me by showing me a baby of 6 months whom he felt certain to be suffering from a ruptured appendix. As usual, "Willie" Owen was right. Midwifery, however, was his first love, and in my opinion he reached specialist standard in that branch of medicine. All this greatness at his work was the result of a lifetime's study. His library, for a general practitioner, was immense, and he had laboured patiently through each volume, checking every disease he had seen. For years, he once told me, he had spent hours every night reading up his cases, doing his blood counts, and supervising the dispensing. The result of all that study, coupled with the most careful history-taking, was a general practitioner of outstanding ability. It was as a personality, however, that "Willie" Owen won the heart of his Welsh people. He was a Welsh-speaking Welshman, whose roots were deep in the hills of Penygroes. As a Celt I understood him. For him Wales was a nation, distinct and separate. Anybody or anything that tended to destroy that separate life and culture found no friendship from him. He often told me that on waking each morning he looked out of the bedroom window and saw his Welsh hills, and that was his tonic for the day. Cities he hated, calling them ulcers of civilization. Now he is dead and Penygroes has lost its greatest friend and helper. It is difficult to think that no more will he polish his silver hair, step smartly from his surgery, give his characteristic little cough, and then settle into his car for the day's round. He loved cars, he loved photography, he loved his friends and his Welsh-speaking village. Most of all, he loved his family and was everything a husband could be to Mrs. Owen during and after her serious illness. To Mrs. Owen, his constant helper, and to her son, Gwyn, also in the profession, our sympathy goes out. They will miss him greatly. So will a young Irish doctor he tried to train.

We record with regret the death of Mr. W. K. CONNELL at Glasgow, on October 31, at the age of 58. William Kerr Connell was born on November 27, 1893, and was educated at the University of Glasgow, where he graduated M.B., Ch.B. in 1916, having interrupted his medical studies to serve as a private in the Highland Light Infantry for six months in 1914–15. After graduation he obtained a temporary commission in the R.A.M.C., and served in Mesopotamia, India, and Waziristan from 1916 to 1920, being a surgical specialist with the Derajat brigade in 1917. He was demobilized from the Army with the rank of captain, and from Bombay he worked his passage home as a ship surgeon, visiting Australia, New Zealand, Panama, and the U.S.A. He was house-surgeon to the late Professor

Archibald Young in Glasgow for six months in 1920 and then he held the post of demonstrator of anatomy in the University of Glasgow in 1921–2. During 1921 he was one of the editors of the *Glasgow University Magazine*. Then followed appointments at the London Hospital and at the Beckett Hospital, Barnsley, until July, 1924, when he entered the Colonial Medical Service. He served mainly as a surgical specialist in Tanganyika. In 1927 he became a Fellow of the Royal College of Surgeons, and he took the D.T.M.&H. in 1930. After his retirement in 1946 he was elected F.R.F.P.S. While in East Africa Mr. Connell acted as honorary secretary of the Tanganyika Territory Branch of the British Medical Association in 1928–9, and was president-elect of the Branch from 1931 to 1934, becoming president in 1934–5 and again in 1938–9. During the last war he was seconded to the Army in 1940 at his own request, but he returned to his civilian duties in 1943 at the end of the Abyssinian campaign. While in the Army he attained the rank of lieutenant-colonel in the East African Army Medical Corps, and was mentioned in dispatches in 1943. He was in charge of the surgical divisions of No. 1 General Hospital, Nairobi, and No. 3 General Hospital, Nyeri, in Kenya. While on leave pending his retirement from the Colonial Medical Service, Mr. Connell joined Unrra and was medical supervisor of displaced persons in the Brunswick area of Germany. He leaves a widow.

Mr. JOHN HARKNESS writes: It was with great regret that I heard of the death of William Kerr Connell. For many years he was an outstanding personality in the Colonial Service. He started his career in Songea, in the Tanganyika Territory, and later, in the hospitals of Dar-es-Salaam, did valuable work in trying and exhausting conditions. His ability and enthusiasm stimulated and inspired his colleagues. I am sure many in the East African community will remember him with affection and gratitude.

Medico-Legal

PARALYSIS AFTER TONSIL OPERATION

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

In February, 1949, Mr. A. L. T. Moon, a driving instructor aged 36, who had for some time been in poor health, underwent tonsillectomy in the Bristol General Hospital. After the operation he complained of inability to move his arms and legs. It was at first thought that his paralysis was hysterical, and he was moved to the Barrow Gurney Mental Hospital. There it was found that there was no trace of hysteria, and he was sent to the Bristol Royal Infirmary. It was reported that on admission he was suffering from spinal cord lesion at C 8, which caused him muscular spasms. He was then further suffering from severe bedsores and from a bad bottle-burn on the abdomen caused by another patient in the ward putting, with the best of intentions, an uncovered hot-water bottle on him.

At the Infirmary he was treated for paralysis. In December, 1949, he was discharged, but in September, 1950, his condition had become so much worse that he was readmitted, and died on December 27, 1950. At necropsy it was found that the cause of death was cancer in the pelvic region. This had never been diagnosed, for owing to his paralysis Mr. Moon had felt no pain.

Mrs. Moon then brought an action against the board of governors of the Bristol United Hospitals and against Mr. Fairman, the surgeon who conducted the operation, alleging that the paralysis was due to injury to Mr. Moon's spinal cord caused by negligence during the operation.

Mr. Justice Devlin, trying the action at Bristol Assizes, held that there was no evidence of negligence against Mr. Fairman whatever, and he was dismissed from the action.

In summing up the case against the hospital governors to the jury, Mr. Justice Devlin commented on the fact that, though it had been discovered that Mr. Moon was suffering from organic paralysis which supervened between the time he was anaesthetized and when he recovered consciousness, the anaesthetist at the operation had not been called to give evidence. He would have thought that everyone concerned would be interviewed at once, and that the anaesthetist would be known and might have had some recollection; but although some inquiries were made by Mr. Fairman and the ward sister they could not have been very extensive. Possibly no one's attention was directed to the vital matter of injury to the spinal cord while it was thought that the paralysis was hysterical.

The jury found a verdict of negligence against the hospital governors and awarded £2,000 general damages, for which judgment was entered with costs. They also awarded Mrs. Moon a further £2,000 damages for her husband's loss of expectation of life, but Mr. Justice Devlin said he would not give judgment for this till he had heard legal argument on Mrs. Moon's right in law in view of the fact that the cancer had intervened. The governors were ordered to pay Mr. Fairman's costs.

Medical Notes in Parliament

CARE OF CHILDREN'S TEETH

Mr. JOHN BAIRD, on November 26, spoke on the school dental service. He thought the best way to solve the problem would have been the introduction of a fully salaried service in 1946. There had been some improvement in the school dental service. In December, 1938, there were 783 dental officers, and by October, 1952, the figure had risen to 827. The present Minister of Health and all dental authorities admitted that a school dental service could not be run efficiently until there were between 2,000 and 3,000 full-time dental officers. The only possibility of getting further recruits was by imposing further charges on dentists in private practice, and if that was done it would destroy the whole basis of the Health Service. Mr. Baird remarked that he spoke with the full authority of the British Dental Association; they believed they had a short-term solution while plans were developed for a new priority dental service. The House had to face having a full-salaried service for all dental practitioners as the only ultimate solution. The Minister had told the British Dental Association that children could not be allowed to go into the general dental service because it would cost more to have the treatment carried out that way. The controversy was between local authorities and the Treasury about who should pay for the school dental service. He appealed to the Government to look into the matter again.

Mr. A. BLENKINSOP said that many dentists were not operating full-time because of the dental charges which had been imposed. The effect of the charges had cut down the number of new entrants into the profession.

Plans to Improve Service

Miss P. HORNSBY-SMITH replied. She pointed out that treatment of children under general dental services since the appointed day had always been available in private practice for parents who accepted the responsibility of taking their children to the dentist. So far as the local authority service was concerned, which included the school dental service, the Ministers of Health and Education believed the best method was to arrange with dentists to treat children in school or in local authority clinics on a full-time or part-time basis. Younger children were provided for in local authority dental service arrangements for mothers and young children. The difficulty was a shortage of dentists in the local authority's dental service. Under the British Dental Association's proposal the treatment which the public dental officer would do would be materially reduced. He would become a co-ordinator, inspecting and deciding the treatment and providing the child with a chit to visit a certain dentist. This suggestion would undermine the present local authority

dental service. Treatment of children in clinics cost substantially less than treatment carried out in private surgeries.

An improvement in the special priority service for children must be sought by expanding local authority clinic services, rather than by transferring part of those services to private surgeons. Two clauses in the Education (Miscellaneous Provisions) Bill would make the provision of local authority clinics compulsory. The Minister of Health had invited the British Dental Association to supply the names of dental practitioners willing to work part-time for school dental clinics, but this request had been met with a cold silence. With regard to Mr. Blenkinsop's point about dentists' charging more than a normal set fee, she believed most dentists were maintaining the fees which had been laid down. So far as new entrants in the profession were concerned, it was not so much a question of applicants not coming forward as of some of them being unsuitable or unable to qualify and take the training. There was no substantial falling off in the number of persons entering the profession.

Infected Second-hand Clothing

Mr. M. K. MACMILLAN asked on November 25 whether the Secretary of State for Scotland was aware of the danger to health from the uncontrolled disposal and sale of second-hand clothing, and whether he intended to take action to control the disposal of personal clothing and bedding of patients dying in institutions and at their homes of tuberculosis and other infectious diseases. Commander T. D. GALBRAITH said that when infectious disease arose the normal practice was for hospitals and local authorities to advise or arrange for the destruction or disinfection of clothing and bedding so far as they considered necessary to avoid the spread of disease.

Food Prices

Mr. FREDERICK WILLEY, on November 26, moved that an address be presented to Her Majesty praying for the annulment of a Sugar Prices Order. He remarked that Lord Boyd-Orr had said the health and physique of the present generation were the most valuable capital asset the nation had. If the Government impaired this asset a very heavy payment would be made in the future.

After further discussion Dr. CHARLES HILL replied for the Government. He said that in the past two and a half years, while food prices went up by £250,000,000, compensation in the form of increased social benefits amounted to £61,000,000. Dealing with consumption, Dr. Hill said that the take-up of sugar was 100%, and that of bacon in the same period of July and August was 96%. The percentage of income expended on food in 1938 was slightly less than 30%. The percentage spent in the third quarter of this year was a fraction more than 32%. On alcohol and tobacco, 10.4% of income was spent before the war and 15.6% to-day. The greatest danger to maintenance of proper nutritional standards for the last few years, and still in a measure to-day, was in the field of the large family. The Government policy was one of allowing people to spend their money in their own way but of making certain that no one was prevented by lack of money from obtaining the food which, on grounds of strength, they needed. There was no evidence of any decline in nutritional standards.

The motion for the annulment of the Sugar Prices Order was defeated by 234 to 208. Mr. WILLEY then moved addresses for annulment of Orders relating to butter and meat.

Butter and Meat

Mr. BAKER WHITE said the fall in the imports of butter was progressive and had started under the Labour Government. It was due to drought, to losses through foot-and-mouth disease, to the rising world population, and to rising consumption in other countries.

Replying, Dr. HILL said that, in this country this year, nearly 15% more red meat had been consumed than in the corresponding period of last year, and there was rather more than a 15% increase in bacon. Liquid milk consumption in this country, per head of the population, was 60% up compared with before the war. The prospect of increased butter production did not seem to be particularly good. The milk-drinking campaign had played a big part in bringing that about.

The motions for addresses were then withdrawn.

Clean Food.—Major Lloyd George hopes, as soon as Parliamentary business permits, to introduce legislation to supplement the Food and Drugs Act for the purpose of establishing a standard of hygiene in catering establishments.

Milk.—About 53% of milk sold in Great Britain comes from cows that have passed an official tuberculin test, compared with about 46% a year ago and 38% two years ago.

Mental Hospitals.—Mr. Iain Macleod stated on November 20 that all but 12 of the 107 mental hospitals in England and Wales are overcrowded. Of the 294 mental hospitals and mental deficiency institutions in the National Health Service 235 reported shortages of nursing staff at September 30. These were 162 short of male staff and 220 short of female staff.

Hearing-aids.—The average cost of "medresco" hearing-aids supplied through the National Health Service up to June last was £3 11s. 6d. This does not include the costs of batteries or of distribution and other overheads.

Vital Statistics

Week Ending November 22

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 2,226, whooping-cough 1,854, diphtheria 41, measles 12,130, acute poliomyelitis 83, dysentery 158, paratyphoid fever 8, and typhoid fever 3.

Infectious Diseases

The largest fluctuations in the number of notifications of infectious diseases in England and Wales during the week ending November 15 were a rise of 771 for measles, from 11,264 to 12,035, a rise of 331 for whooping-cough, from 1,449 to 1,780, and a rise of 89 for scarlet fever, from 1,976 to 2,065.

The largest rises in the incidence of measles were 219 in London, from 989 to 1,208, 193 in Yorkshire West Riding, from 900 to 1,093, and 138 in Durham, from 412 to 550. The largest exception to the general rise in measles was a fall of 155 in Suffolk, from 363 to 208. The largest increases in the returns for whooping-cough were 34 in Lancashire, from 273 to 307, and 33 in London, from 80 to 113. A rise of 50 in the number of notifications of scarlet fever in Essex, from 182 to 232, was the largest variation in the local trends. 44 cases of diphtheria were notified, 17 more than in the preceding week, and the total was the largest for the past 35 weeks. The rise in diphtheria was mainly contributed by two cities—London, where the notifications increased from 1 to 7, and Birmingham, where the rise was from 2 to 9.

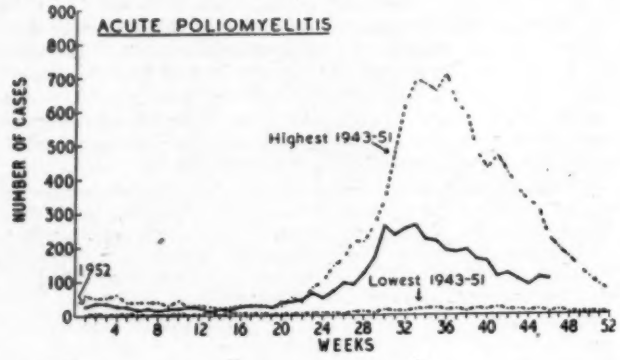
The notifications of acute poliomyelitis, 104, were 1 more for paralytic and 14 fewer for non-paralytic cases than in the preceding week. The largest returns during the week were London 12 (Lewisham 3, Woolwich 3); Essex 12 (Southend-on-Sea C.B. 3); Surrey 10 (Croydon C.B. 4).

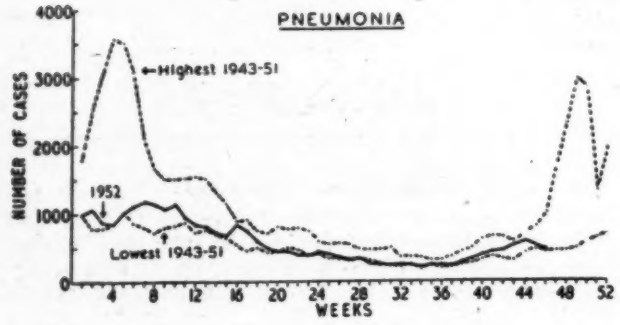
Dysentery notifications decreased by 2, from 213 to 211. The chief centres of infection during the week were London 46 (St. Pancras 18, Wandsworth 9); Lancashire 45 (Blackburn R.D. 17, Blackpool C.B. 14); Lincoln 22 (Grimsby C.B. 17); Surrey 17 (Coulsdon and Purley U.D. 9); Middlesex 15 (Edmonton M.B. 8); Warwickshire 12 (Coventry C.B. 9).

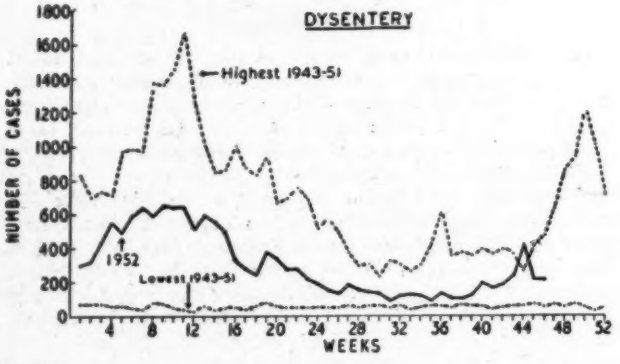
The largest outbreak of food-poisoning involved 85 persons in Suffolk, Thingoe R.D.

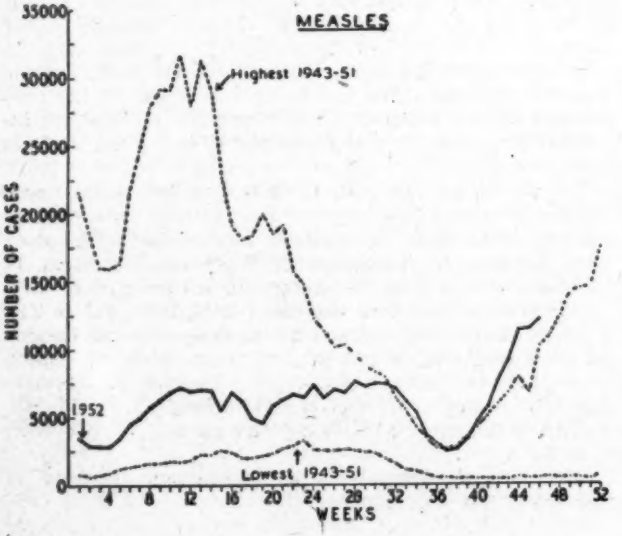
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1943–51 are shown thus - - - - - - -, the figures for 1952 thus ————. Except for the curves showing notifications in 1952, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **November 15** (No. 46) and corresponding week 1951.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire
Diphtheria	44	7	13	0	2	38	1	10	1	2
Dysentery	211	46	106	1	3	240	44	77	2	1
Encephalitis, acute	2	0	0	0		6	1	1	0	
Enteric fever: Typhoid	3	1	0	1	1	4	0	0	1	2
Enteric fever: Paratyphoid	5	0	0	0		14	0	0	0	
Food-poisoning	151	10		0		84	18		0	
Infective enteritis or diarrhoea under 2 years				7	8				17	31
Measles*	12,035	1208	207	16	130	2,084	47	118	191	92
Meningococcal infection	29	4	13	0	2	42	3	16	2	1
Ophthalmia neonatorum	29	0	8	0		45	4	6	1	1
Pneumonia†	452	36	290	5		467	31	204	7	
Poliomyelitis, acute: Paralytic	82	11	6	1	4	45	3	14	0	9
Poliomyelitis, acute: Non-paralytic	22	1				20	2			
Puerperal fever§	226	20	12	1		238	43	10	2	
Scarlet fever	2,065	180	331	18	135	1,473	139	308	31	51
Tuberculosis: Respiratory			138	27				140	33	
Tuberculosis: Non-respiratory			24	5				22	5	
Whooping-cough	1,780	113	80	42	64	1,833	62	320	62	105

DEATHS in Great Towns	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire
Diphtheria	0	0			0	*0*	0	*0*	0	0
Dysentery	1	0					0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0				*1*	0	*0*	0	
Infective enteritis or diarrhoea under 2 years	4	1	2		0	*7*		*1*	0	0
Influenza	8	0	1		1	*11*	1	*1*	0	0
Measles		0			0		0	*0*	0	0
Meningococcal infection		0	2				0	*1*		
Pneumonia	176	29			3	*179*	28		9	6
Poliomyelitis, acute	4	0			0	*3*	0			1
Scarlet fever		0			0		0	*0*	0	0
Tuberculosis: Respiratory	108	20	10		4	*145*	18	*26*	1	13
Tuberculosis: Non-respiratory		1	1		1		1	*4*	1	0
Whooping-cough	0	0			0	*1*	0	*1*	1	0
Deaths 0–1 year	218	32	38		6	*189*	31	*32*	8	20
Deaths (excluding stillbirths)	4,975	747	513		137	*4,674*	753	*581*	118	191
LIVE BIRTHS	6,827	1060	766		346	*6,167*	1040	*710*	200	362
STILLBIRTHS	183	23	20			*187*	23	*23*		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

The Scientific Exhibition.—Prospective exhibitors at the scientific exhibition at next year's B.M.A. Annual Meeting at Cardiff are asked to apply for stands without delay (see *Journal*, October 18, pp. 874 and 879). Although the last day for applications is December 31, it would help greatly if as many applications as possible could be received before that date. It is hoped to make the exhibition an even greater success than the one in Dublin last July. Application forms may be obtained from the Secretary, B.M.A. House, Tavistock Square, London, W.C.1.

New Insulins.—During a recent address to the Section of Medicine of the Manchester Medical Society Dr. W. G. Oakley described three new insulins which have been prepared by Hallas Moller, chief chemist of Novo Laboratories, Copenhagen. Prolonged action is obtained without the use of protamine or globin by substituting acetate for phosphate as a buffer. These preparations have been named "semi-lente," "lente," and "ultra-lente," and are suspensions of insulin and zinc at *p*H 7. It is claimed that the new preparations, which are not yet generally available, have all the advantages of the usual mixtures of soluble and protamine-zinc insulins, and in addition give more constant results because of their even absorption. A therapeutic trial at King's College Hospital has confirmed their prolonged action.

Royal Medical Society.—A hundred years ago the Royal Medical Society, which had then already been in existence for 116 years, moved into new premises at Melbourne Place, Edinburgh. Last month, in honour of the occasion, Professor R. W. Johnstone delivered an address there in which he reviewed the Society's activities during the past 100 years. The most notable impression Professor Johnstone had gained from a study of the old minute books was of the unceasing cavalcade of those who subsequently became famous in every branch of medicine. At an earlier celebration, the presidents' annual dinner, Dr. W. A. Alexander, P.R.C.P.Ed. and treasurer of the Society, was made an honorary president, the highest honour which the Royal Medical Society can confer.

Pro-Chancellorship of Queen's University, Belfast.—Brigadier J. A. Sinton, V.C., F.R.S., was elected a Pro-Chancellor of Queen's University at a meeting of the Senate last month. The Chancellor of the University is Lord Alanbrooke, and the other Pro-Chancellor Lord MacDermott, Lord Chief Justice of Northern Ireland. Brigadier Sinton, who was himself educated at Queen's University, graduated in 1908 and joined the Indian Medical Service three years later. He was awarded the Victoria Cross during the 1914–18 war while serving in Mesopotamia. After that war he returned to India, where he became director of the Malaria Survey. It was for his services to tropical medicine, particularly for his work on malaria and kala-azar, that he was elected F.R.S. in 1946. Brigadier Sinton retired from the I.M.S. in 1938. During the last war he served as consultant malariologist to the Army.

Prevention of Pneumoconiosis.—Experts from 16 nations are now meeting at the headquarters of the International Labour Organization in Geneva to plan measures to reduce the incidence of pneumoconiosis. The medical aspects of the problem were discussed at an I.L.O. conference in Australia in 1950, and the present meeting will therefore concentrate on the techniques of dust prevention and suppression. In Great Britain last year there were more than 3,500 new cases of pneumoconiosis among miners.

President and Council of Royal Society.—Dr. E. D. Adrian was re-elected President of the Royal Society at its meeting on December 1. Of the 10 new members of the council elected at the same time three have close connexions with medicine: Professor E. G. T. Liddell is professor of physiology at Oxford; Professor R. A. McCance is professor of experimental medicine at Cambridge; and Professor Alexander Robertson is professor of organic chemistry at Liverpool.

Metropolitan E.N.T. Hospital.—As a result of the Minister of Health's intervention (see *Journal*, November 22, p. 1161) the South-west Metropolitan Regional Hospital Board has postponed the move of the Metropolitan E.N.T. Hospital's in-patient department to the Western Hospital, Fulham, and looked into the question of alternative accommodation for it. The board has now told the Minister that it considers St. Mary Abbots Hospital, Kensington, a suitable alternative. This arrangement is acceptable to St. Mary Abbots Hospital, and it now remains for the board to reach agreement with the medical staff of the Metropolitan E.N.T. Hospital.

Rural Health in Uganda.—In a recent address to the Legislative Council the Governor of Uganda, Sir Andrew Cohen, announced a £1m. plan for the expansion of Uganda's rural health services. The plan provides for a substantial increase in training facilities for medical assistants, nursing orderlies, assistant hygiene inspectors, and hygiene orderlies, and forecasts the establishment of 32 "rural curative and preventive units, each with 30 beds including 10 maternity beds," from 1956 onwards, at the rate of 8 units a year.

Research on Leukaemia.—The Vice-Chancellor of Cambridge University, Sir Lionel Whitby, announced last week that Mr. Samuel Storey, M.P., is giving £17,780 over the next six years for research on leukaemia and allied diseases in the Department of Medicine. The benefaction is in memory of Mr. Storey's wife, who died last year, and will be known as the Elisabeth Storey Fund.

Legacy to Hastings Fund.—Mrs. Ada Hilda Franklin Dawson, of Salcombe, Devon, who died on March 31, 1952, left her entire estate of £10,242 (with the exception of a legacy of £100) to the Sir Charles Hastings Fund, expressing the wish that it be used for the benefit of British-born medical practitioners and for those of their widows and children "who are really in need and unable to help themselves by their own efforts."

David Anderson-Berry Prize.—A prize of about £100 and a David Anderson-Berry medal will be awarded by the Royal Society of Edinburgh next year for the best recent work on the therapeutic effect of *x* rays in human disease. Applications for the prize, which may be based on both published and unpublished work, should be in the hands of the general secretary, Royal Society of Edinburgh, 22, George Street, Edinburgh, 2, not later than March 31, 1953. Applications should be accompanied by copies of any relevant papers.

Synthesis of Cortisone.—Dr. Ripley Oddie, medical director of Bayer Products, Ltd., entertained last week a number of guests at a luncheon to commemorate the synthesis by Bayer Products of cortisone acetate. Among those present were Sir Robert Robinson, Sir Henry Cohen, Sir John Charles, Sir Horace Evans, Major-General Sir John Taylor, and Mr. J. W. Tudor Thomas.

Emergency Bed Service: Applications and Admissions.—During the seven days ending December 1 the number of applications made by doctors to the London Emergency Bed Service for admission of patients was 1,335, of whom 88.53% were admitted.

Sir Andrew Davidson, chief medical officer of the Department of Health for Scotland, has been elected an Honorary Fellow of the American Public Health Association for his "outstanding contribution to public health." The election took place at the recent annual meeting of the association in Cleveland, Ohio.

Dr. A. B. MacGregor, dental consultant to St. Bartholomew's Hospital, has been appointed to the chair of dental surgery at Birmingham University. The chair has recently been named the John Humphreys Chair of Dental Surgery, after a former lecturer in dental anatomy. Dr. MacGregor will take up his appointment next October.

Dr. W. Pointon Dick, formerly medical director of a Metropolitan mass radiography unit and attached to the Medical Research Council's tuberculosis research unit, has gone to the Gold Coast to advise the Government on the prevention, control, and treatment of tuberculosis.

Dr. Gavin Thurston, deputy coroner of West Ham, has been called to the Bar by the Inner Temple.

COMING EVENTS

Heberden Society.—The annual general meeting of the Heberden Society will be held on December 12 and 13 at the Eastman Dental Theatre at the Royal Free Hospital. The annual dinner will be on December 12. Further details may be obtained from the general secretary of the Society, c/o Empire Rheumatism Council, Tavistock House, Tavistock Square, London, W.C.1.

Symposium for General Practitioners.—A one-day symposium for general practitioners, on surgical diagnosis and minor surgery, will be held at Addenbrooke's Hospital, Cambridge, on December 20. Those wishing to attend should notify the secretary of the Cambridge University Medical School, the Naval Hut, Downing College, Cambridge, not later than December 13.

Food and the Future.—The Nutrition Panel of the Food Group of the Society of Chemical Industry will discuss the subject of "Food and the Future" during the coming session. The first of four consecutive meetings on this theme will be held at Burlington House, London, W.1, on December 10 at 6.15 p.m., when Mr. F. Le Gros Clark and Dr. E. W. Russell will speak on "The Problem of Future World Food Supply."

NEW ISSUES

Journal of Neurology, Neurosurgery and Psychiatry.—The next issue (Vol. 15, No. 4) will be available in a week's time. The contents include:

THE ELECTROMYOGRAM IN MYOPATHY: ANALYSIS WITH THE AUDIO-FREQUENCY SPECTROMETER. John N. Walton.
THORACIC INTERVERTEBRAL DISC PROLAPSE WITH SPINAL CORD COMPRESSION. Valentine Logue.
STUDIES OF ISCHAEMIC AND POST-ISCHAEMIC PARAESTHESIAE IN NORMAL SUBJECTS AND IN SCIATICA. John Marshall.
THREE CASES OF ACHONDROPLASIA WITH NEUROLOGICAL COMPLICATIONS. John D. Spillane.
A SEX-LINKED VARIANT OF GARGOYLISM. C. Guy Millman and J. W. Whittick.
ELECTROENCEPHALOGRAPHIC STUDIES IN CEREBRAL ANGIOMA. D. P. Rosenberg.
DISORDERS OF PERCEPTION AND PERFORMANCE IN A CASE OF RIGHT-SIDED CEREBRAL THROMBOSIS. R. W. Gilliatt and R. T. C. Pratt.
SOME MECHANISMS OF TACTILE LOCALIZATION REVEALED BY A STUDY OF LEUCOTOMIZED PATIENTS. Alick Elithorn, Malcolm F. Piercy, and Margaret A. Crosskey.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

Details in this column are necessarily brief. Further information and tickets where required (marked ●) should be obtained from the institution concerned.

Friday, December 5

BRITISH ASSOCIATION OF PLASTIC SURGEONS.—At Royal College of Surgeons of England, 2 p.m. Papers: (1) Burns, (2) Reconstruction Following Total Pharyngolaryngectomy; 5.30 p.m., annual general meeting.

Monday, December 8

●HUNTERIAN SOCIETY.—At Talbot Restaurant, 7 for 7.30 p.m., dinner meeting. Discussion to be opened by Dr. A. H. Douthwaite and Dr. H. Gardiner-Hill: Obesity.
●INSTITUTE OF CHILD HEALTH.—5.30 p.m., Dr. C. H. Andrewes, F.R.S.: Virus Infections Before and After Birth.
INSTITUTE OF PSYCHIATRY.—5.30 p.m., Dr. E. Stengel: Lecture-demonstration.
LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Professor P. Gyorgy (Pennsylvania): Blood Group and Related Polysaccharides in Growth and in Resistance to Disease, with Special Reference to Human Milk.
MEDICAL SOCIETY OF LONDON.—8.30 p.m., discussion to be introduced by Mr. A. C. Palmer: Results of Injury to the Pelvic Diaphragm in Women.
ROYAL EYE HOSPITAL.—5 p.m., Dr. T. H. Whittington: The Physiology of Accommodation Clinically Considered. Treatment of the Hypermetrope.

Tuesday, December 9

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. C. E. Dent: Chromatography in the Study of Amino-acid Metabolism.
CHADWICK TRUST.—At Wright-Fleming Institute, St. Mary's Hospital Medical School, 4.30 p.m., Malcolm Morris Memorial Lecture by Dr. A. I. G. MacLaughlin: Prevention of Dust Diseases of the Lungs.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. D. I. Williams: Erythrodermias.
MANCHESTER MEDICAL SOCIETY.—5 p.m., Dr. R. W. Fairbrother: Antibiotics.
ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Professor A. A. Moncrieff: Children in Hospital.
ROYAL COLLEGE OF PHYSICIANS OF LONDON.—5 p.m., FitzPatrick Lecture by Dr. Maurice Davidson: Medicine in Oxford (1).
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—4.30 p.m., Harben Lecture by Lord Horder: Fifty Years of Medicine.
WEST END HOSPITAL FOR NERVOUS DISEASES.—5.30 p.m., Mr. K. I. Nissen: Prevention and Treatment of Deformity in Infantile Paralysis.

Wednesday, December 10

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. H. Haber: Bullous Eruptions.
MANCHESTER MEDICAL SOCIETY.—4.30 p.m., Dr. M. T. Parker: Epidemiology of Enteric and Salmonella Infection in the Manchester Area.
MEDICAL ART SOCIETY.—At 11, Chandos Street, W., 8 p.m., Mr. David Birch: discussion on members' work.
MIDLAND MEDICAL SOCIETY.—At Birmingham Medical Institute, 8.15 p.m., Professor G. W. Pickering: Natural History of Essential Hypertension.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—4 p.m., Professor F. Wood Jones, F.R.S.: John Hunter as a Geologist.
ROYAL EYE HOSPITAL.—5.30 p.m., Mr. L. H. Savin: Surgery of Ocular Injury, Detachment, etc.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—5 p.m., Finlayson Memorial Lecture by Sir Sydney Smith: Medicine, Magic, and Religion: The Persistence of an Idea.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—4.30 p.m., Harben Lecture by Lord Horder: Fifty Years of Medicine.

Thursday, December 11

ALFRED ADLER MEDICAL SOCIETY.—At 11, Chandos Street, W., 8 p.m., Dr. A. Spencer Paterson: The Crisis of Adolescence.
BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. A. Neuberger, F.R.S.: Biochemical Genetics.
EPSOM AND SUTTON INTER-HOSPITAL PSYCHIATRIC ASSOCIATION.—At Long Grove Hospital, 6.30 p.m., clinical demonstrations.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. W. Riddell: Mycology—Subcutaneous Mycoses.
OXFORD UNIVERSITY.—At Nuffield Orthopaedic Centre, 8.30 p.m., Professor R. Merle D'Aubigné (Paris): The Late Results in the Treatment of Hip Conditions by Arthroplasty with Inert Prostheses.
ROYAL COLLEGE OF PHYSICIANS OF LONDON.—5 p.m., FitzPatrick Lecture by Dr. Maurice Davidson: Medicine in Oxford (2).
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5 p.m., Robert Jones Lecture by Professor George Perkins: Rest and Movement.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—4.30 p.m., Harben Lecture by Lord Horder: Fifty Years of Medicine.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—7.30 p.m., Dr. G. W. A. Dick: Epidemiological Notes on Some Viruses Isolated in Uganda. A discussion will follow.
ST. ANDREWS UNIVERSITY.—At Materia Medica Department, Dundee, 5 p.m., Professor I. G. W. Hill: Rheumatic Heart Disease.
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Sir Paul Mallinson: Lecture-demonstration in psychiatry.
ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.—4.15 p.m., Dr. Bernard Lennox: Pathology of Epithelial Skin Tumours.
●WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—At South Kensington Hotel, 7.30 for 7.45 p.m., dinner; 8.30 p.m., Mr. V. Zachary Cope: Medicine and Modern Society.

Friday, December 12

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. M. B. MacKenna: Clinical demonstration.
INSTITUTE OF NEUROLOGY.—5 p.m., Professor S. Zuckerman, F.R.S.: Effect of Certain Endocrine States, and in particular Thyroid Deficiency, on the Development of the Nervous System.
KENT AND CANTERBURY HOSPITAL.—8 p.m., clinical meeting.
OSLER CLUB OF LONDON.—At Medical Society of London, 7.45 p.m., Mr. R. R. Simpson: Shakespeare and the Influence of his Son-in-law, Mr. John Hall, Physician.
ROYAL EYE HOSPITAL.—5.30 p.m., Mr. Howard Reed: Slit-lamp Appearances and their Diagnostic Value.
WEST KENT MEDICO-CHIRURGICAL SOCIETY.—At Miller General Hospital, S.E., 8.30 p.m., Purvis Oration by Dr. Wilfrid Sheldon: Children in Wartime.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Shepherd.—On November 21, 1952, at the Middlesex Hospital, London, W., to Audrey (formerly Arnott), wife of Dr. Peter Shepherd, a son.
Wilkie.—On November 17, 1952, at the Royal Simpson Memorial Maternity Pavilion, Edinburgh, to Dr. and Mrs. Lindsay Wilkie, "Leith Mount," 46, Ferry Road, Leith Edinburgh, a daughter—Joyce Catherine.

MARRIAGES

Carey—Topping.—On November 29, 1952, in London, Dr. Richard John Carey to Dr. Margaret R. Topping.

DEATHS

Anderson.—On November 14, 1952, at 20, Milford Road, Walton, Stafford, Gilbert Norman Anderson, M.B., Ch.B., D.P.H., aged 68.
Evans.—On November 11, 1952, in hospital, Gwladys Evans (formerly Garfield), M.R.C.S., L.R.C.P., of 5, Crossfield Avenue, Porthcawl, Glam, aged 39.
Nicholson.—On November 18, 1952, at The Lake House, Rougham, Bury St. Edmunds, Suffolk, Roger Brighouse Nicholson, O.B.E., M.C., M.R.C.S., L.R.C.P. Major, I.M.S., retired.
Shepherd.—On November 15, 1952, in a Guildford nursing-home, Charlotte Dorothy Shepherd, M.B., Ch.B., of 146, Harley Street, London, W., and Bramshott Court, Liphook, Hants.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Prevention of Sunburn

Q.—*I am shortly due to spend a holiday skiing and wish to avoid the severe sunburn which I suffered on the last occasion. What preparations are advised for use on exposed skin? Is it possible to "acclimatize" the skin in any way before leaving for the holiday?*

A.—Several substances will protect the skin effectively, but tannic acid is the least likely to cause irritation or sensitivity. It is applied to the skin in 5% concentration and may be dissolved in spirit or in ung. emulsificans aquosum, *B.P.* The latter is clean to use and probably more effective. The cream affords a remarkable degree of protection. It will even withstand sea-bathing fairly well provided the skin is allowed to dry afterwards and not rubbed with a towel. It is advisable to apply the cream two or three times a day. However, it is important to remember that application of the cream will prevent the skin developing tolerance to light, and if the cream is left off suddenly the skin may burn just as easily as it would have done on the first day of exposure to strong sun. It is therefore best to discard the cream gradually.

The skin can certainly be acclimatized to strong sunlight by progressive exposure to ultra-violet light. For this purpose a carbon-arc lamp produces more rapid tanning of the skin, but the mercury-vapour lamp perhaps builds up resistance to ultra-violet light more quickly. I would suggest exposure to ultra-violet light two or three times a week for a month or six weeks before going on holiday.

Treatment of Thyrotoxicosis

Q.—*Please give the indications for thiouracil, surgery, and radioactive iodine, respectively, in the treatment of thyrotoxicosis. Surgeons and physicians appear to hold very divergent views on the treatment of this condition, and I would appreciate a sound opinion.*

A.—All three methods of treatment (if properly used) will control thyrotoxicosis. Any one of them could therefore be used to treat any thyrotoxic patient, in the confident expectation that the symptoms would be relieved. But each treatment has its own advantages and disadvantages, which render it more or less suitable in different situations. Thus subtotal thyroidectomy is particularly indicated where there is mechanical distortion of the trachea, as in most cases of toxic nodular goitre; and in patients whose occupations make long-term supervision impossible. On the other hand it is inadvisable where any mental abnormality suggests the possibility of a post-operative psychosis, or indeed when the patient is terrified by the thought of undergoing an operation; when a toxic goitre has recurred following a previous thyroidectomy (for the danger to parathyroids and recurrent laryngeal nerves is then much greater); and in those cases where ocular paresis or chemosis suggests that the malignant exophthalmos syndrome may result if thyrotoxicosis is relieved too rapidly. The thiouracil group of drugs is particularly worth using in young patients with short histories and not too large goitres (in about half a course of treatment lasting about a year will be followed by a permanent remission); and in those in whom operation is undesirable on account of threatening malignant exophthalmos or for psychological reasons. Radio-iodine is particularly useful in cases which have recurred after a previous thyroidectomy, and for those with very vascular goitres. Radio-iodine is a very pleasant treatment for the patient and may well become the routine for all elderly thyrotoxic patients. Owing to the possibility (as yet unsubstantiated) of delayed local carcinogenesis it should not be given to patients under the age of 45 unless the indications are very strong indeed. It is also better not used in the presence of auricular fibrillation, because there may be considerable delay in getting thyrotoxicosis under control, and the chances of a reversion to normal rhythm are thereby decreased. Patients who do not fall into any of the above categories may reasonably be given a single course of treatment with one of the thiouracil drugs of about a year's duration; if a relapse subsequently occurs it can be dealt with by thyroidectomy or by radio-iodine. It is often an advantage to discuss the pros and cons of the three methods of treatment with the patient; if he has any strong preference this should be taken into account.

Inheritance of Myopia

Q.—*A husband and wife both have moderate myopia—about three dioptres. Are their children likely to be affected?*

A.—There are not enough critical data on which this simple question can be answered. It is a common clinical experience that there tends to be a greater incidence of myopia in the children of myopic parents than amongst the general population, and there are selected pedigrees which show dominant, recessive, and sex-linked transmission of myopia. What is not known is whether these represent exceptional or common situations.

Myopia of the type seen in the two parents in this question probably occurs in about 15 to 20% of the population. The chances that the children will also be myopes of this type are therefore somewhere about 1:6. It is likely that the chance is actually greater, but nothing definite can be said, nor must it be assumed that because both parents show apparently the same type of myopia the children must inevitably be myopes. Such an assumption would be justified if we knew that myopia is in fact hereditary, regularly expressed, and that both parents were homozygous for the assumed gene of low-grade myopia. No such information is as yet available. The fact that both parents show the same degree of myopia does not necessarily mean that they have actually the same type of myopia. On theoretical grounds it is possible to postulate that one parent is myopic because of a high refracting system in the eye and the other because of a long axis. If this were the case—and it is quite a plausible assumption—the children would not stand any greater chance of being myopes than the rest of the population.

Failure of Bowel Training

Q.—*Where a child's bowel training has been seriously mismanaged (regular use of suppositories, spankings, etc.), what steps should be taken at the age of 3 years to train the child in cleanliness? The child still soils its nappies, and does not use the pot although sat on it for long periods.*

A.—This is always a difficult problem with which to cope. It is necessary first of all to know whether the child is constipated or not. Chronic constipation results in a type of overflow incontinence, which may disguise the failure to pass motions normally. In that case hard faeces may be palpated in lumps through the abdominal wall, and a rectal examination will show the rectum to be loaded. Inspection of the anus and the rectal examination will help to exclude a cause of local pain, such as a fissure. Next, mental retardation may be the cause of either constipation or dirty habits, and so must be considered as a possibility. The history of a period during which normal stools were passed will help to exclude Hirschsprung's disease as a cause for constipation.

If the dirty habits seem to be due to constipation with overflow, the most effective regime seems to consist in a prolonged course of daily colonic washouts, accompanied by the administration of a laxative mixture containing

neostigmine. The dose of this is regulated to produce one soft daily motion, and the number of washouts gradually reduced in frequency. It is generally best to start this treatment in hospital because of the difficulty in getting it done at home, and because of the difficulty in ensuring that a proper lavage is given and not an enema. A thorough course of this nature will often produce a cure of the constipation, and with it the dirty habits.

However, almost always, whether or not constipation is present, faulty upbringing and emotional disturbances in the family are at the root of this sort of behaviour. It is probably uncommon for the toilet training to be the only thing that is wrong, and it is more likely to be the whole management that is inadequate. It is likely that the questioner, if he is the family doctor, will already be aware of this and have attempted to put things right by common-sense discussion and advice. If this has failed, and if constipation, if it is also a symptom, persists after energetic and careful treatment, then reference to a child guidance centre will be necessary. A child with behaviour difficulties of this sort will certainly require the expert help of a child psychiatrist, unless some simple cause such as constipation is found early, and unless rapid improvement follows treatment.

Tissue Involvement in Mumps

Q.—*Orchitis, oophoritis, pancreatitis, and mastitis may all occur as complications in mumps. What is the connexion between the above complications and the parotid glands? What is the origin of the word "mumps"?*

A.—The virus of mumps is capable of multiplying in other cells than those of the salivary glands, and the complications in which the testicle, ovary, or pancreas are involved result from a more general spread of the virus; in a similar way the central nervous system may be affected with meningo-encephalitis. Commonly these "complications" occur some four to seven days after the onset of parotitis, but they may precede it or even occur in the absence of the involvement of the parotid or other salivary glands. It seems incorrect, therefore, to speak of them as complications. It has been suggested that during the incubation period the virus multiplies somewhere in the upper respiratory tract, giving rise to a generalized infection which may result in the involvement of various organs or tissues, of which the salivary glands and the parotid in particular are the most commonly affected.

The origin of the word "mumps" is obscure. It is thought to be the plural of the old English (seventeenth century) word "mump," meaning to grimace or make a face.

The Hairs on a Hairy Mole

Q.—*What is the best way of epilating a hairy mole? Where can this be done?*

A.—Many authorities would think it unwise to interfere with a hairy mole unless by complete surgical excision, for fear of provoking malignancy. Epilation is, however, often undertaken by means of electrolysis or diathermy, and the writer has not himself seen any harmful effects. It would seem wise to allow treatment to be the responsibility of a dermatologist.

Physiological Variation in C.S.F. Pressure

Q.—*What physiological variations are there in the pressure of the cerebrospinal fluid? Does the pressure vary with inspiration and expiration or with the blood pressure? Does holding the breath cause a rise in the pressure?*

A.—The normal C.S.F. pressure in the lateral position ranges between 70 and 180 mm. of water; slight degrees of muscle tension resulting from nervousness may cause an increase of pressure of from 30 to 60 mm., and for this reason it is advisable in some cases to wait for several minutes after the needle has been inserted into the theca before taking the pressure-reading. C.S.F. pressure varies with the intracranial venous pressure, and for this reason it may be raised in congestive heart failure and in patients with mediastinal tumours. The C.S.F. pressure has no constant relationship to the arterial blood pressure. Straining movements such as coughing or holding the breath may cause a rise in the C.S.F. pressure.

Corneal Herpes

Q.—*Has there been any recent advance in the treatment of corneal herpes? Are any of the newer antibiotics useful?*

A.—None of the new antibiotics has proved effective against the herpes group of infections. This, however, does not mean that there has been no advance in the treatment of the group of infections labelled as herpes corneae. The diagnosis of herpes corneae is always uncertain, and most clinicians tend to use the more inclusive diagnostic label of superficial punctate keratitis—a bad name, for it does not differentiate between the different affections that produce superficial punctate staining of the cornea when fluorescein is instilled into the conjunctival sac. One of the affections that gives this morphological reaction is epidemic keratoconjunctivitis with its characteristic clinical picture of acute onset, watery discharge, hyperaemia of the conjunctiva, superficial punctate staining, and enlarged preparotid nodes. This condition is endemic, but tends to occur in epidemics. The instillation of 1% chloramphenicol ointment two-hourly for five to seven days generally clears this rather stubborn presumed virus infection. In true herpes of the cornea, chloramphenicol is without effect, and nothing but symptomatic treatment can be undertaken.

NOTES AND COMMENTS

Prolapse in a Young Mother.—Mr. WILFRID MILLS (Birmingham) writes: It would be interesting to know what your expert ("Any Questions?" November 8, p. 1057) means by his phrase, "to condemn a woman to the pessary life." It suggests the use of the rubber-covered spring pessary, with its inevitable vaginitis, discharge, and need for renewal every three months. It seems a pity that he did not discuss the use of the simple hard plastic ring that requires no attention beyond removal for cleaning once or twice a year. This has a limited field, for it seldom controls a rectocele or stress incontinence, and a contracted vaginal vault may make fitting impossible. However, in the case in question, a young mother with complete uterine prolapse and an incomplete family, the pessary may be most satisfactory. The operative treatment suggested—anterior and posterior colporrhaphy without removal of the cervix—requires the most expert performance if it is to cure complete prolapse without causing dyspareunia and without recurrence after a subsequent vaginal delivery.

OUR EXPERT writes: The point raised by Mr. Mills is an important one The rigid plastic ring has many advantages over the rubber ring and is very useful in certain cases. Nevertheless, it has its limitations, and as a general rule operative treatment of prolapse is preferable. The need for a careful operative technique was emphasized in the original reply. Poor surgery inevitably gives poor results in prolapse as in all other fields.

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